1859 PUBLISHED WEEKLY 1920

AMERICAN GAS ENGINEERING JOURNAL

FORMERLY

AMERICAN GAS LIGHT JOURNAL

Library of Congress
NOV 8 1920
Smithsonian Deposit

VOL. CXIII., No. 19
WHOLE No. 3270

NEW YORK, SATURDAY, NOVEMBER 6, 1920

Subscription $3 per year
$4 Canada $5 Foreign

THE BARTLETT HAYWARD CO.

Designers and Builders
of

COMPLETE ARTIFICIAL GAS PLANTS

For the manufacture of
COAL GAS
CARBURETTED WATER GAS
and
BLUE WATER GAS

BY-PRODUCT PLANTS

GAS HOLDERS

STEEL TANKS

WASTE HEAT BOILERS

COKE SCREENING PLANTS

FAST FLEXIBLE TURBO-COUPLINGS

WHITE AND MIDDLETON GAS ENGINES

APPARATUS FOR CLEANING INDUSTRIAL GASES

THE BARTLETT HAYWARD CO.

Main Office and Works :: :: BALTIMORE, MD.

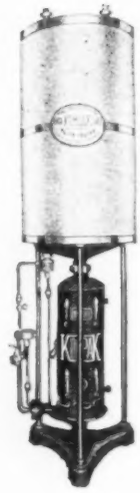
INDEX TO CONTENTS, PAGE 371 ADVERTISERS' INDEX, PAGE 20

Where There's
GAS

You can always install a

KOMPAK

What Does This Mean?



It means a new era in the selling of automatic gas water heaters. Specialized salesmen are no longer required. Kompak automatic water heaters can be installed in every home without spending a dollar for new meters or services. KOMPAK automatic water heaters give perfect hot water service under any or all conditions. You see then that

Where There's
GAS

You can always install a

KOMPAK

THE KOMPAK COMPANY

New Brunswick - - - New Jersey

C. B. BABCOCK COMPANY
768 Mission Street, San Francisco, Cal.
Pacific Coast Representative

M122

AMERICAN GAS ENGINEERING JOURNAL. Nov. 6, 1920. Vol. CXIII, No. 19. Published Weekly by American Gas Light Journal, Inc., New York, N. Y. Subscription Price $3 per Year; $4 Canada; $5 Foreign.
Entered as second-class matter January 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

American
Gas Engineering Journal

FORMERLY THE AMERICAN GAS LIGHT JOURNAL

Vol. CXIII, No. 19 NEW YORK, NOVEMBER 6, 1920 Whole No. 3270

Great Fundamental Economic Question Which Finally Must Settle All Rate Controversies Not Yet Touched Upon

At What Point in Cost Does Consumer Begin to Curtail?—When Does the Industrial Consumer Begin to Balk to Other Fuels?

By L. W. ALWYN-SCHMIDT

The abnormal conditions in the coal and labor market have forced many American gas works to appeal to their respective public service commissions for an increase in the gas rates, in order to make both ends meet. The argument in such cases is, in a word, that the high cost of producing gas justifies a higher price to the consumer in view of the fact that the gas works have to carry frequently non-paying accounts in the interest of an equal rate all through the distribution field.

Increases have been allowed in some instances. In others they have been fought severely by the consumers and those representing them. So far nothing new has been produced in favor of either party.

The gas works have not claimed any special emergency but that of higher cost, and have not made any special promises for the future. The consumer has resisted against the higher price merely because he is disinclined to pay more for his gas.

The great fundamental economic quesuons which finally must settle the whole controversy have not been touched upon. The reason being most likely, that neither side has to offer any workable alternative.

During the war, when prices were raised for most any commodity, it was often said in support of the cost advanced that the higher price would help to reduce the consumption of the article as the consumer naturally would be more careful with its use. It has not occurred to anybody that the consumer has made only too good use of that advice, with the result that there is to-day an actual surplus of many of these commodities which were raised indiscriminately during the war to the disadvantage of the producer.

We hear from the South that the cotton producers are actually intent on destroying part of the cotton crop and similar news comes from other sources although nothing is heard yet about invoking the Lever act to prevent such an occurrence.

Has it ever occurred to the gas industry that increases in the cost of gas may lead to a reduction in the consumption?

The question certainly must be faced, which is the reason why it is discussed more fully in this place.

Gas Bill Not Questioned When Moderate

The monthly gas bill is to most gas consumers a matter of indifference. The householder will complain occasionally to those using gas inside his home about an increase in the gas bill and if the bill remains high for a length of time steps will be taken to stop the wasteful use of gas. But the business of the gas works does not suffer considerably by such attempts of economy.

It is difficult to say how much every householder is inclined to allow for gas consumption in his home.

It is, however, certain that a certain amount cannot be overstepped and that whenever it is exceeded action will be taken to reduce consumption.

The gas industry in increasing its rates for light and cooking gas cannot easily overstep this boundary between easy-going consumption and strict economy in the American households.

The writer has it on best authority that following the recent rise of gas prices in New York many householders have seriously started to preserve gas. Gas is not burned any more unless it is absolutely necessary and even the use in the kitchen is curtailed to the lowest permissible amount.

It is likely that the gas works just now will not feel very much these attempts of curtailment, in view of the fact that sales of gas are still on the increase in any well-managed distribution field. But it is doubtful whether the attitude taken by the consumer will really benefit the gas works and whether not more harm is done to the prestige of the gas industry than good.

The flat dweller, as a rule, has no means of escaping the higher gas bill. He cannot very well change over from gas to coal. But in cities where families still live in individual homes such a step may very well be possible. The problem is one of pure household economy. Take the case of a family of six, renting half a house as is mostly the case. Such a family may spend between $8 and $10 a month for gas. Let the bill be raised at the rate of 40 per cent, as has been done in several instances and it is a question of practical test whether it will not pay such a family to discard the gas stove

entirely and heat with coal, in view of the fact that coal is already required for the purpose of heating the furnace. This, if repeated many times, means a serious loss of business to the gas industry.

Let us consider this point a little further.

The gas industry fights at present a battle for its very existence as a lighting industry. Every household that uses gas in the kitchen is making a sort of a fortress for the gas industry, because such a household, as a rule, is using also some gas for lighting, if not all. There are still a great many houses even in New York where gas is used exclusively. Let these households get disinterested in the use of gas and the result will be that electric light will take the place of gas lighting, while coal will be burned in the kitchen. But there is also a national aspect to this particular problem. At the present time the nation has in the gas industry a very powerful asset in support of the chemical industry. The importance of this asset has been realized fully only during the war, when Germany, for instance, has made efforts to keep the gas industry going and practically forced her citizens to use a certain quantity of gas, so as to keep up the supply of coal by-products. If gas rates should increase above the level securing to the gas industry a normal consumption the nation will lose the aid of the gas industry in the manufacture of these by-products. None of these by-products in fact can be produced without producing also gas.

Gas Prices an Industrial Problem

The private consumer is still the backbone of the market of the gas industry all over the world. But the time has come when gas is reaching out for a new field to conquer and it is practically certain, that a few years from to-day more gas will be used for industrial than for private consumption. Already the industrial load is encroaching heavily upon the private load and the insistency of the industrial demand forms quite a problem for the gas works in certain districts. The gas industry would be very shortsighted if it would not recognize the importance of this development for the future of gas making and anything that might be done to help it along should be done in the interest of the gas producers. But one can hardly expect industrial gas consumers to get enthusiastic about the offers of the gas industry with gas rates rising against the consumer.

Here is the typical problem as it confronts a modern manufacturer:

This man owns a power plant which has been using coal all along in the past. The coal no doubt has gone up in price and the operation of the plant has been more and more costly. Step by step this has affected his production policy and he is now ready to make some change. He has a number of choices. He may scrap his power plant altogether and replace the present central power source by a number of small power sources in the form of electrical motors. This has been done with advantage in printing establishments and other factories where power is used irregularly in connection with a large number of individually running machines. He may run a large electric motor with a transmission system working all machines from one electrical center. He may equip his factory with an oil motor or a number of them. Or he may also introduce a gas-firing system. I suppose a number of other expedients will suggest themselves: the present list, however, may be sufficient.

Which of these power sources will he select? Which would you select in his place? There cannot be any doubt about the answer. He will select that which is cheapest and which promises to be the most permanent. The writer has discussed this particular question in the course of his consulting duty most thoroughly over and over again with manufacturers, and he has not found much encouragement for his plan to replace coal firing by gas firing. The reason has been in each instance the disinclination of the power user to deliver himself over entirely to the good will of the gas company. The financial estimate may sound nice enough when it is made with the present rates. "What, however," asks the manufacturer, "is to happen if the rates should suddenly go up?" Let us understand that the average manufacturer has no sentiment as far as his power source is concerned. He may be patriotic enough if it is a matter of subscribing to a public loan or supporting his party. But he cannot see his personal advantage in using gas for the purpose of supporting the national chemical industry with by-products if gas should cost him more than the competitive power source. Here, therefore, is the stumbling block in the path of the gas industry to secure the bulk of the industrial business.

It costs a manufacturer to operate his power plant to-day a certain amount of money which is composed of the following principal items of expenditure: Coal, carrying coal, labor. The gas company will have to prove to the consumer that it will supply him with the gas at a cost below that which it costs to-day to pay for the forementioned items. Generally speaking, the chances for the gas industry are very good in the contest. The industrial consumer buys the coal at the present time at approximately the same cost as the gas company if he buys in large quantities. If he should buy smaller quantities only, the gas company has already the advantage of purchasing cheaper raw materials. The carrying of the coal to the consumer is a cost item, entirely in favor of the gas company, while the labor item will be considerably reduced by gas firing. Added to this is a point in favor of great convenience, cleanliness and greater precision. But the principal point naturally must be: At what price can the industrial consumer take the gas from the company? If this price should be higher than that of coal the deal is lost at the start. If it should rise later when once the gas-firing installation is made the harm done to the plant is practically irreparable.

There is staring us in the face, therefore, the hard fact that the gas industry cannot expect to get the really important part of the industrial business, that of supplying the fuel for the steam-power installations, unless it can compete in price with the cost of the coal-firing systems.

The Case in a Nutshell

We all wish to see the gas industry expand its sales volume because we realize the benefit to the national household at large of such an occurrence. But it is no good talking about the progress that can be made and declining at the same time to follow the straight course, which lies in the direction of making gas consumption popular with all possible consumers.

The stumbling block is the apparent or real inability of the gas industry to supply gas at rates low enough to make the use of gas attractive to the consumer.

Here, then, is the spot where the gas industry has to decide upon its future policy. Shall it derive its earnings from the sale of a high-priced necessity which is

(*Concluded on page* 372.)

Disposal of Waste from Gas Plants

L. J. Willien Presents Report of American Gas Association 1920 Committee

The pollution of streams by the discharge of waste from industrial plants is attracting the attention of public authorities more and more each year, and gas plants are receiving their share of the blame for such pollution; sometimes it is just and sometimes unjust, declares L. J. Willien, chairman, in presenting the report of the 1920 Committee, on disposal of waste from gas plants, of the American Gas Association.

There is no doubt that stream pollution has increased enormously within a brief period, especially during the period of the World War. The situation is naturally worse in the older States and in the manufacturing States. It naturally is least significant in the parts of the country removed from centers of manufacture.

The manufacturing of the present is characterized in a conspicuous way by the chemical processes involved. These lead to the production of quantities of peculiar waste materials that are discharged into streams, many of which in concentrated form are poisons, and cause trouble.

The following are the injurious effects which are attributed to the waste from gas plants:

1. *Driving Away of Fish and Damaging Oyster Beds in Streams.*—Although the waste from gas plants may be perfectly clear, it will often contain in solution many substances which are poisonous, and some of the most poisonous are those which are commonly regarded as insoluble in water such as naphthalene, benzene, xylene, etc. In general, the greater the amount of tar emulsions, the more toxic or poisonous the waste, especially in the case of coal tar.

2. *Damage to Paint on Pleasure Boats.*—This is caused by the waste from a gas plant. Usually a water gas plant which contains an appreciable amount of tar emulsion, discharging into a stream on which there are pleasure boats. The tar emulsion floats either on the surface or near it. If it washes against the side of a boat, it will be discolored.

3. *Objectionable Odors.*—Discharge of waste from gas plants into a city sewerage system may result in an offensive odor going up through the drain pipes into houses connected with the sewer. We know of one instance where trouble of this nature resulted from the overflow liquor from the tar wells.

4. *Pollution of Wells.*—This is caused by the seepage of gas-plant waste through the ground and contaminating the ground water. This may result from a crack in a tar well or holder pit through which tar leaks, or from leaky tar, oil and ammonia pipes.

5. *Deposits in Sewerage Systems.*—This is likely to to happen where a coal gas plant discharges the waste from an ammonia concentrator directly into a sewerage system without removing the lime. Even if the lime is removed by means of settling tanks, there are lime salts in solution which will precipitate out on contact with certain organic compounds in the sewerage at a temperature of 150 deg. Fahr. or more.

6. *Pollution of Drinking Water Supply Where Water Is Chlorinated.*—The presence of phenol, cresols, hydrocarbons of the benzene series, anthracene and naphthalene, in water, will impart a very disagreeable taste to the water when chlorinated. Boiling the water accentuates the taste instead of eliminating it.

Waste from gas plants may be classified as follows:

1. *Coal Gas and Coke-Oven Plants.*
   - (*a*) Ammonia still waste.
   - (*b*) Drip liquor.
   - (*c*) Cyanogen overflow.
   - (*d*) Coke quenching water.
2. *Carburetted Water Gas Plant.*
   - (*a*) Overflow from seal pot or washbox.
   - (*b*) Oveflow from holders when they do not go to tar separators.
   - (*c*) Drip liquors.
3. *By-Products and Chemical Plants.*
   - (*a*) Sludge from agitators.
4. *General (Applicable to all types of plants).*
   - (*a*) Leaks in gas, tar and oil lines.
   - (*b*) Leaks in holder pits.
   - (*c*) Surface water around plant.
   - (*d*) Local conditions affected by municipalities chlorinating drinking water supply.
   - (*e*) Location of plants on small streams where waste would be particularly noticeable.
   - (*f*) Spent oxide.

Coal Gas and Coke Oven Plant—Ammonia Still Waste

The waste liquor leaving an ammonia still is a light brown liquid turbid with particles of spent lime and tarry matter having a peculiar offensive odor. It is strongly alkaline and exceedingly hard, due to its lime content. Most of the lime settles rapidly, leaving a comparatively clear liquid, the chemical composition of which is somewhat complex. It contains large amounts of acidic and basic tar oils and sulphur compounds and absorbs large amounts of oxygen.

The effect of discharging ammonia still waste into a small stream renders the water poisonous to fish and cattle and generally unfit for any of its ordinary uses. The capacity of ammonia still waste for absorbing oxygen is detrimental to streams in preventing the self-purification which goes on under ordinary conditions.

The purification of ammonia still waste is one of the problems that has not been satisfactorily solved. It is easy, by use of settling tanks, to get rid of the suspended matter of solids, but these, although objectionable, are innocuous compared with the matters in solutions.

In places where the sewage is treated, discharging the ammonia still waste into the sewer, is liable to interfere with the treatment of the sewage. At a temperature above 150 deg. Fahr., some of the lime in solution in the ammonia still waste will precipitate out on contact with some of the organic matter in ordinary sewage. It is, therefore, essential that the temperature of the waste be below 150 deg. Fahr. if discharged into a sewer.

Some of the plants, especially coke oven plants, have disposed of the ammonia still waste by using it for quenching the hot coke as it is discharged from the ovens, but it was found that on evaporation into the atmosphere, the objectionable constituents of the waste liquor deposited on the vegetation in the surrounding neighborhood and injured the vegetation.

The suspended matter in many cases should be re-

moved from ammonia still waste regardless of whether it eventually runs into a sewer or stream. As stated above, this is best accomplished by use of settling tanks. There should be at least two tanks connected in series with a total capacity equal to at least a half day's flow. By-past connections should be arranged so that the tanks can be cleaned. In flowing from one tank to another, a weir arrangement is best and an arrangement should be provided for holding back any scum or foam that may form on the surface of the liquor.

Drip Liquor

All drip liquors should be pumped to a tar well or tank where the water will have a chance to separate, or it may be run through the regular tar separator such as those described in the Appendix.

Cyanogen Overflow

In the recovery of cyanogen from coal gas by the Bueb process, all the liquors produced are worked up for the recovery of ammonium sulphate, so there is no waste liquor discharged during any of the operations of this process. The filter press washings are used for making up new copperas solutions, and the cyanide is in the form of insoluble compounds. The accidental loss of any of the process liquors would not require any special method for their treatment, as these liquors contain either iron or ammonium sulphate.

The same is true of the Prussiate process, as it would only be through accidental loss that any waste would occur.

The only material discharged in the Bueb operation is the iron sulphide, which is used for admixtures with the purifying material.

From the standpoint of economical operations, the plant should be safeguarded against the loss of process liquors. This is best accomplished by careful supervision.

In the Lessing process, in which the cyanogen is removed from gas free from ammonia, such as would be the case where ammonium sulphate is produced by the semi-direct process, like the Koppers process, the only waste liquor would be a solution of sodium sulphate. If desired, this could be recovered by running the solution through an evaporator and then cooling it in crystallizing pans, where the sodium sulphate would crystallize out and be recovered as Glauber's salts.

Coke Quenching Water

At all gas plants where coke is produced, water is required for quenching the hot coke. The amount of water which escapes is generally not large, but there may be some excess, and this may carry with it sufficient fine coke in suspension and dissolved impurities to render it unfit to discharge to a stream.

The suspended coke can be readily deposited in settling tanks, and the remaining liquid pumped back for reuse. The settling tanks should be large enough to hold at least four hours' maximum flow and should be in duplicate to allow of cleaning, and the overflow from these tanks from which the water can be pumped back.

Where clean water only is used for quenching, the effluent from the settling tanks can be entirely freed from suspended matters and tarry particles by being strained through a fine bed of coke or a filter of wood shavings, and may then be used for any other purpose around the plant, or may even be discharged to a stream without detriment; but this process consumes large quantities of water, a ton of water per ton of coke quenched.

Carburetted Water Gas Plants

The waste from a carburetted water gas is suspended matter of an oily tarry nature, dark in color; is insoluble in water and tends to deposit on the shores of a stream in the form of a shiny coating.

The quantity of effluent waste flowing from a water gas plant varies greatly with local conditions but should be from 5 to 10 gal. per 100 cu. ft. of gas made.

The principal problem in the handling of the waste from a water gas plant is the separation and removal of the oily and tarry matter. Ordinarily, a well-designed tar separator or settling basin will remove all of the oily and tarry matter from the waste so that it will be perfectly clear as it leaves the separator and settling basin.

In localities where the waste from a water gas plant flows into a stream which runs through a public park, it may be necessary to install an elaborate filtration plant.

Sometimes an emulsion of tar and water or oil and water or both is formed which contains as high, if not more, than 75 per cent water. This emulsion passes through the tar separators, fouls the coke in the coke filter or sand in sand filters so quickly that the effective capacity is greatly reduced. Such an emulsion can be handled by means of a tar dehydrating still which not only breaks up the emulsion but will also reduce the water content of the tar itself and thereby renders it more marketable.

The Sharpless Specialty Company (501 Fifth Avenue, New York) has recently developed a process for the dehydration of water gas tar emulsions.

Very few units of the Sharpless process have been installed in gas works. The committee, however, has received a report from one plant which shows in a rough way the results obtained. In six months, between 40,000 and 50,000 gal. of water gas were reclaimed at a saving of a little more than $1,000. This was a net saving, inasmuch as the tar emulsion was worthless and could not be disposed of in any other way. The emulsion was filling up the wells, and was dangerous to throw away; consequently it was worth something to be able to dispose of it. The emulsion delivered to the machine contained between 25 per cent and 50 per cent of water. The resultant tar varied from 0.5 per cent to nearly 5 per cent. The water content can be reduced to less than 1 per cent if necessary, but this requires more time and the outflowing water from the machine is not quite so clean. In this particular plant the reclaimed tar was used as fuel and 5 per cent of water was not objectionable. In fact, the reclaimed tar gave better satisfaction as boiler fuel than the tar pumped direct from the wells as lampblack and coke breeze were all removed and there was no trouble from stopping burners.

The Sharpless process seems to be especially efficient with the separation of emulsions from water gas machine seals when using low-gravity residuum oils, which emulsions are very difficult to handle in any other way. The capacities of these machines are rather small—about 100 gal. per hour. However, if they are as efficient as the above report shows, there should be a considerable

Library of Congress
NOV 8 1920
Smithsonian Deposit

field for this appliance, and it may be possible to develop one of larger capacity.

The waste flowing from a water gas plant can be materially reduced if the water or liquor from the last compartment of the tar separator is used in the seal or washbox of a water gas machine. Many plants run fresh water in the seal or washbox which overflows and runs to the tar separator and then runs to waste. Recirculating this water or liquor would reduce the amount of tar and oil in the waste to a minimum, also the amount of waste.

Overflow from Seal Pot or Wash Box

The overflow from the seal pot or wash box of a carburetted water gas machine should pass through a tar separator. The bottom of tar separators should be frequently cleaned, and any sediment removed to ensure the most efficient operation.

Overflow from Holders and Surface Waters

The overflows from the relief holders and storage holders should run through the separators or filter boxes. In some instances, surface water from around the plant should be collected in drains and pumped to the separators.

Drip Liquors

All drip liquors should be pumped either to the relief holder tank or else to the tar separators. The overflows from the relief holders and storage holders should also run through the separators or filter boxes, and in some instances, surface water from around the plants should be collected in drains and pumped to the separators.

By-Product and Chemical Plant

This includes the sludge which is obtained from the purification of light oils and is met only in plants that scrub their gas for the recovery of these light oils.

The amount of sludge accumulated from light oil plants where the gas is scrubbed at the inlet of the purifiers is much larger than when the scrubbing is done at the outlet of the purifiers.

Leaks in Gas Tar and Oil Lines

Leaks often occur in gas, tar and oil lines which cause considerable damage before they are discovered. The gas usually works its way up through the ground and can be detected by its odor. Tar and oil, however, seep down through the ground, mix with the ground water and are carried along until they come to the surface finally discharging into some stream.

Leaks in Holder Pits

Brick holder pits sometimes develop cracks from settling. These cracks usually occur diagonally, and allow the contents of the pit to leak out. They can be temporarily repaired by drilling two-inch holes and pouring in plastic cement. These holes should be not more than 18 in. apart when the crack runs on an angle away from the vertical line. If the crack runs nearer to a horizontal line, more holes are necessary. This is due to the fact that the plastic cement will not flow up hill, even under a head due to the material being at a higher level in the two-inch holes drilled. This material will work its way into the cracks and harden, thereby stopping the leaks. The above treatment will have to be repeated every summer, as warm weather softens the plastic cement, causing it to gradually seep out from the cracks.

The above method of treatment is applicable only to holder pits which develop cracks in the sides. Where cracks develop on the bottom of the pits, it will be necessary to put the holder out of commission and drain out all of the tar and water from the pit.

Local Conditions Affected by Municipalities Chlorinating Drinking Water Supply

The principal purpose of chlorinating water is to kill the typhoid bacillus. Chlorine was first used in purifying water in 1907 by Colonel George A. Johnson, who was engaged in making the water of Bubbly Creek in the Chicago stockyards less offensive to sight and smell. All of the waste liquids from the packing houses ran into this stream. The liquids are full of organic matter which putrefied, and in those days, as it passed along the creek, large quantities of unpleasant gases were given off. The putrefaction was carried on by the action of bacteria, and the sanitary problem was to kill these organisms, thus making the water a suitable home for the bacteria which do the work of the public health officer. This was finally accomplished by gassing the bacteria with chlorine, which kills them.

The process was successful beyond all expectations and was tried soon afterward in sterilizing the water supplies of Jersey City, Scranton and Johnstown. By the end of 1911, about 500 municipal water supplies were chlorinated.

Up to 1911 the chlorinating was effected by the use of bleaching powder. This method required continuous intelligent supervision of the apparatus in order to be successful, and there were a great many water supplies where it was impracticable to give such attention. About 1911, it was found that liquid chlorine could be used more easily and accurately than bleaching powder, and that the beneficial effect would be the same. With this discovery came the development of new methods and new apparatus which have practically revolutionized the treatment of water for human consumption. Apparatus for chlorinating water has been installed in 2,000 water works.

In some cities where the water is chlorinated considerable trouble has been experienced with the water having a disagreeable medicinal taste. This taste has been found to be due to the presence of small traces of phenoloid bodies and tar derivatives. The disagreeable taste in water caused by overchlorination can be eliminated by boiling, whereas, the medicinal taste is intensified by boiling, and is imparted to foodstuff cooked in the water.

Trouble has been experienced with medicinal taste in the following places:

1. *Birmingham, Ala.*—Due to tarry matter with freshly dipped cast-iron pipe used for a water main, through which water was passed before the tar had an opportunity to dry.

2. *Sandusky, Ohio*—Due to the waste from a producer gas plant supplying gas to a glass manufacturing plant.

3. *Cleveland, Ohio*—The quench water used on coke by large manufacturing plant when chlorinated pro-

duced the characteristic medicinal taste. The waste from this plant discharged into the Cuyahoga River through a 36-in. pipe flowing full capacity. The medicinal taste in the Cleveland water, however, occurred more frequently during the movement of ice in the harbor, and especially by movements of ice out of the mouth of the Cuyahoga River toward the water works intake. In this case, the surface currents in the lake appeared to be associated with the direction and velocity of the wind.

4. *Milwaukee, Wis.*—The effluent waste from the gas plants and two chemical plants, both using tar products, were found to have a medicinal taste when chlorinated. The medicinal taste in the Milwaukee city water was also dependent upon certain wind conditions which drove the river water toward the city supply intake similar to the Cleveland experience.

5. *Indianapolis, Ind.*—The medicinal taste was due to the waste from the gas plant, especially the quench water used on the coke. In this case, the nuisance was abated by repeated use of the quench water by running it into a holding basin, and thereby preventng it from discharging into the stream.

It seems that the phenoloid bodies and tar derivatives in the waste liquor from the ammonia stills of by-product coke and gas works produce the most pronounced taste. Still waste may be considered to contain roughly, and on the average, from one to two grams of phenoloid bodies (considered as phenol) per liter, or correspondingly one to two parts of phenol per thousand parts of still waste. Mixing one part of still waste with 1,000 parts of distilled water gives a solution having a phenol content of one part per million, which has practically no perceptible disagreeable taste, but if the mixture is chlorinated there is a positive medicinal taste imparted to the water. Dilutions of one part of still waste with 50,000 parts of water will give a solution containing one to two parts of phenols in 50,000,000 parts of water, and this, when chlorinated, will have a medicinal taste. With greater dilutions, the taste is doubtful and is dependent on the source of the still waste and the source of the water used to dilute it.

At the present time, there is no satisfactory method of removing or destroying the constituents of gas plants which impart a medicinal taste to water, when chlorinated. This is the most important problem which the committee has to solve, and the minute quantities of objectionable constituents in the waste liquor which causes trouble, makes it an extremely difficult problem.

Location of Plants on Small Streams Where Waste Would be Particularly Noticeable

This refers to a location on a small stream which runs through the heart of a town or city or a park system, in which case discoloration of the water would be noticed as well as any disagreeable odor. Under such conditions, the waste flowing from the gas plant must be free from all tarry and oily matter, as well as odor.

Spent Oxide

Spent oxides from coal gas plants which contain 10 per cent or more of cyanogen can usually be sold to a concern which manufacturers Prussian blue.

Spent oxide from water gas plants does not contain any cyanogen and, consequently, has no value as a source of Prussian blue. Neither can this oxide, nor oxide from coal gas be used for the manufacture of sulphuric acid. The organic matter which the oxides contain interferes with the process of making sulphuric acid. This can be overcome, to a great extent, by the use of a mineral slag, instead of wood shavings, in making up the oxide. Mineral slag is a blast-furnace slag; it is very light, porous and incombustible.

The use of spent purifying material on driveways around gas plants is not to be recommended, as it would then be a source of contamination of surface waters referred to in a previous part of the report.

In case spent oxide is disposed of by carting it to the city dump, it should be covered with earth in order to prevent any possibility of its catching fire, in case the waste material around the dump takes fire. When spent oxide burns, a very disagreeable odor is given off which would create a nuisance around the neighborhood, and under certain atmospheric conditions, would be noticeable a great distance away.

Investigations Show Campaigns Are Successful in Achieving Results

H. J. Pettengill, Jr., Submits Annual Report of the 1920 Sub-Committee of American Gas Association on Special Sales Campaigns

One of our member companies writes to the sales campaigns committee of the American Gas Association, according to the annual report of H. J. Pettengill, Jr., chairman: "The combined efforts of salesmen and advertising in the promotion of sales of seasonable appliances always produces great results." Other companies write as follows:

"Sales campaigns stimulate and increase sales."

"They bring to the attention of the public appliances about which they know little."

"They increase gas sales."

"They create good-will."

"They replace with new appliances those which are worn out and antiquated."

"They add new customers."

"They make selling easy."

"They can be conducted successfully on a profitable basis."

Your committee feels the best evidence it can show that campaigns can be and are being conducted successfully by gas companies is to give you the actual results as they have been found to exist among our member companies. Last year's report of the committee was most complete and it presented a very complete schedule of suggested activities, together with a comprehensive plan for putting this schedule into effect. But complete as this report was, it could only incorporate the ideas of but a small group of men. Your committee felt that its most important function this year was to get that report squarely before member companies and secure their opinion as to the practicability of the schedule as recommended by the association. The results of this investigation are of interest.

Demonstrations of Success

Eighty-eight companies returned complete replies to the questions asked of them. The results of these replies are as follows:

(*Concluded on page 373.*)

Substitutes for Human Senses Have Wide Variety and Make for Economy in Gas Supply

S. S. Amdursky Explains Principles Upon Which Temperature Instruments and Leak Detectors Work

The rapid strides made in the gas manufacturing industry are due in no small measure to the application and use of pressure and temperature indicating, recording and controlling instruments, declared S. S. Amdursky in a paper read before the twenty-seventh annual convention of the Pacific Coast Gas Association at Portland, Ore.

While in the early days temperatures above 1,000 deg. Fahr. were detected by color, and provision in the generators and furnaces was made to peek into the fire and observe the color of the heated fire bed with the human eye, to-day such methods are obsolete.

Just as the development and refinement accomplished in gas manufacture produced increased yields and efficiencies and raised the quality of the product and standardized the process, so has the development and refinement of the apparatus and processes in the manufacture of temperature and pressure indicating, recording and controlling instruments raised the standards and made it possible to produce instruments that give extremely accurate and consistent results.

Notwithstanding the fact that the majority of gas plants use instruments that are available for the many applications that exist in the gas making industry, there are some companies that are not quite so familiar with these instruments and their applications. There are other companies which, because of lack of information, do not give the care and attention in the selection of the proper instruments and their particular applications, and as a result they are not receiving the maximum yields and efficiencies they would otherwise receive if they made the proper selection of the instruments, investigated the method of manufacture, the method of testing and calibrating and the reputation of the concern from which they purchase these instruments.

Some plants use temperature and pressure indicating instruments only, while the more modern plants use recording and regulating instruments in addition to the indicating types.

The indicating instruments give only momentary readings, while the recording instruments not only indicate the temperature and pressure at the particular moment but maintain a permanent record of the existing temperatures and pressures on a properly graduated chart. Since changes in operation can only be detected by changes in temperature and pressure, the recording instruments serve an important purpose and will soon pay for the additional investment made.

The indicating thermometer is perhaps more reliable for consistent operation than the recording type. This is true because of the fact that it has no mechanical moving parts. It is therefore used as a check on the recorder.

Higher Efficiencies by Uniform Operating Conditions

The higher efficiencies can only be obtained by maintaining uniform operating conditions. To accomplish this, automatic regulation for the control of temperature and pressure through the various pieces of apparatus is desirable. Such instruments can accomplish what is perhaps impossible for any human being to do, since they are continually on the alert to control any tendency toward varying temperatures or pressures.

Only after years of experience and careful study of the requirements of the particular apparatus and process used in the gas industry can a manufacturer produce instruments that can be depended upon for accurate and consistent operation.

There is considerably more to the manufacture of a mercury thermometer than filling a glass tube with the fluid and graduating the tube into so many divisions. The different kinds of glass and their particular composition are of prime consideration in selecting tubes to cover the particular range required. After the thermometer is manufactured (and this process is quite elaborate), the thermometer tube must be properly aged. If this is not done, after a little use the thermometer will give inaccurate readings and the inaccuracy increases with continued use.

Natural and Artificial Aging of Tubes

Two methods are employed in aging thermometer tubes, one called natural aging and the second one artificial aging. In the former process the tubes are completed and, before being pointed, are stored for a period of time found to be sufficient to properly age them. They are then pointed. The artificial aging process consists of heating the bulbs to a temperature far in excess of the maximum range of the tube and holding this temperature for several days. However, it takes a considerably longer period for natural aging than artificial aging.

Thermometers that are to be applied to mechanical apparatus require the proper selection of material used to protect the thermometer tube. For example, in taking temperatures in exposed gas mains the temperature of the gas is approximately that of the surrounding temperature. Since gas is not a very good contact medium, a sensitive type of bulb on the thermometer is necessary. For this reason the bulb chamber is insulated from the scale case, so that changes in temperature around the case will not affect the reading of the thermometer. The materials from which the bulb and scale case are made are dependent upon the corrosive action of the atmosphere in which the instrument is to be used. For example, if ammonia vapors or fumes are present it is desir-

able to protect the bulb by cast-iron separable socket. The scale case should be coated black with an acid-resisting paint or with a japan that will not be attacked by ammonia. If a brass-finish case is used it would soon turn black, due to the corrosive action of ammonia on this material.

The same carefulness in selecting the proper materials for the particular apparatus and conditions under which the instrument is to be operated is exercised in the manufacture of recording and regulating instruments.

Whether in the manufacture of coal, carbureted water or oil gas, the proper temperature and pressure at the various stages in the different processes are essential to increased efficiency. The temperatures at the different points will indicate whether the reduction is taking place most efficiently, while the pressure indications will give information on existing friction through each piece of apparatus.

Settings in Coal Gas Manufacture

In coal-gas manufacture two types of settings are used. The older type of setting is called the direct fire, in which the fuel in the fire box is completely burned under the retorts and the heated products of combustion pass through the passages around the several retorts in the bench. In this setting the retorts are either in a horizontal or an inclined position. The second type of setting, called the generator or producer gas setting, uses the heated product of combustion by burning the hot producer gas with the proper amount of air and passing these through the spaces between the retorts. In this setting the retorts are usually in a vertical position. Included in the retort benches of this latter setting are recuperators for preheating the air used to support combustion. In addition to this, a waste heat boiler installation is sometimes made. This boiler is heated by the waste gases after they have preheated the air in the recuperators. Some types of generators or producers have water-jacketed steel fire boxes instead of refractory lined furnaces. In the retort benches of coal-gas manufacture, whether of the direct fire or producer furnace type, the object is to reach temperatures in the retorts sufficiently high so that all the volatile carbon in the coal is driven off, yet not so excessively high as to melt down the refractory lining or result in napthalene deposits in the distribution line. It is, of course, impractical to take temperatures inside the retorts, so that the temperatures on the outside of the retorts are taken instead; and since the outside of the retorts attains higher temperatures than the inside, this indication is perhaps more important to prevent melting of the refractory material. The temperatures obtained are around 2,800 deg. Fahr.

In the direct fire coal-gas furnace or in the producer gas generator, temperatures of the furnace fire, drafts through the fire bed and through the setting are indications of operating efficiencies. Reduced temperatures in the flues will indicate blowholes or excessive air being supplied to the fuel bed, or air leakage through the setting. Increased temperatures, especially in the flue of the producer gas generator, will indicate secondary combustion.

Reduced drafts will indicate thick fire beds or stoppages in the path of the hot gas, while increased drafts will indicate blowholes.

Temperature Gauges Completeness of Combustion

In the case of producer gas setting, temperature indications in the outlet of the recuperator will give a check on whether combustion is taking place in this apparatus, while temperature taken of the producer gas going to the recuperator will give a check on operating efficiencies. The former temperatures are about 1,000 deg. Fahr., while the latter are usually between 1,600 and 1,700 deg. Fahr.

Where waste heat boiler installations exist, the temperatures of the gases after passing through the boiler will give information on the operations of this apparatus. These temperatures run about 500 deg. Fahr.

Instruments used for taking these various temperatures, which are in excess of 1,000 deg. Fahr., are called pyrometers. These may be classified into two general divisions: one, optical and radiation pyrometers, and the other, thermoelectric pyrometers. The optical type of pyrometer operates on the same principles as the photometer used in measuring the candle-power of light. By rotating the eyepiece a beam of selected monochromatic light from the hot body is adjusted to equal intensity with a beam of light from an incandescent lamp. It is *not* a color-matching instrument, and in consequence readings can be taken repeatedly by different observers with remarkable consistency. The scale is graduated on the shield surrounding the eyepiece, over which a pointer is adjusted until the beams of light are in focus. The temperatures of the body are indicated by the position of the pointer.

The radiation type of pyrometer, of which the Fery is the one most universally used, differs in principle of operation from an optical pyrometer, in that it absorbs the rays of heat given up by the body and focuses these rays on a delicate thermo-couple within the instrument. The thermo-couple is connected to a millivolt meter, whose scale is graduated directly in degrees Fahrenheit or Centigrade. The current generated when the thermo-couple is heated is in proportion to the intensity of heat. The deflection of the millivolt meter will indicate the existing temperature.

In the thermoelectric type of pyrometer temperature measurement is taken by inserting a fire-end, which includes a thermo-couple covered with a protecting tube or sheath, into the heated atmosphere. The heated thermo-couple generates a current which causes the millivolt meter to indicate the existing temperatures. For temperatures not over 2,000 deg. Fahr. so-called base metal thermo-couples are used and a metal protecting sheath, such as wrought iron, steel or nichrome, is provided. For temperatures up to 3,000 deg. Fahr. rate metal thermo-couples are used and a refractory protecting sheath, such as quartz, alundum or porcelain, is provided.

In taking temperatures with a thermoelectric type of instrument one must realize that the temperature indicated, unless otherwise provided, is the difference between the cold end (the end where connections are made) and the hot end (the end in the heated atmosphere) of the thermo-couple; that is, if the indicating temperature is, say, 1,500 deg. Fahr. and that surrounding the cold end is 100 deg. Fahr., the actual temperature in the hot end would be the difference between the two, or 1,400 deg. Fahr. If the temperatures at the cold end are uniform, then

the zero correction can be made directly in the instrument. However, where these temperatures fluctuate, and in order to eliminate the necessity of making corrections for cold and temperature, when readings are taken several methods are employed. One is to provide a water or steam jacket at the cold end, so that water or steam at uniform temperature may flow through and maintain a uniform temperature at this point. A better method is to connect compensating leads and the ends of the wire leading to the instrument in the ground, where this junction would be kept at a uniform temperature.

In the gas industry, for taking temperatures between 1,000 and 2,000 deg. Fahr. base metal pyrometers are universally used. It has been found from experience that nichrome protecting tubes give longer life to the thermo-couple than any other form of protection. This metal will resist the oxidizing atmosphere of carbonic gases at high temperatures.

The Why of Ammonia Removal

In the selection of a thermoelectric pyrometer it is desirable to specify a high-resistance type. With this type of instrument it is not necessary to use leads of any limited or fixed length, since small changes in resistance will not effect an appreciable error in the readings.

The crude coal gas contains tar, ammonia and sulphur. The ammonia is removed not only because of its corrosive action upon metals used in meters and lighting fixtures, but also because of its commercial value, which makes the removal of this by-product from the gas worth while. The removal of tar is obvious. The importance of removing these by-products at proper temperatures, however, is perhaps not so universally recognized. Tar at high temperatures will absorb some of the illuminants from the gas, so it is necessary to cool the tar to prevent this absorption. On the other hand, if the cooling is done too quickly the hydrocarbons will condense and decrease both the candle-power and the yield. It is therefore essential to reduce the temperature in steps in order to obtain the highest yield. The drop in temperature through the primary condenser or washer-cooler is usually 40 deg. Fahr. (from 150 deg. at the inlet to 110 deg. at the outlet). An exhauster is used between the primary and secondary washer-cooler in order to raise the pressure so that the gas will overcome the resistance to flow through the remaining pieces of apparatus. The exhauster is usually of centrifugal type and its action on the gas tends to raise its temperature a few degrees, so that while the inlet temperature is approximately 110 deg. Fahr. the outlet is raised to 114 deg. Fahr. The drop in temperature through the secondary washer-cooler is also about 40 deg., so that the outlet temperature is reduced to 75 deg. At this stage practically all the tar has been removed, and it remains for the scrubbers to remove the ammonia. In the modern plants so-called intensive scrubbers are used for this purpose. Due to the chemical action between the ammonia and the water, which absorbs this element, the temperature rises from 75 deg. Fahr. at the inlet to about 78 deg. Fahr. at the outlet of this apparatus. After leaving the scrubbers, the gas, which contains sulphur as the only remaining impurity, is passed over a bed of iron oxide to remove the sulphur content. The removal of the sulphur is hastened if the action takes place at a definite temperature. In most purifiers steam coils are provided so as to hasten the chemical action. The inlet temperatures to the purifiers are about 74 deg. Fahr., while the outlet temperatures are raised to 80 deg. Fahr. because of the chemical action which takes place and the addition of heat.

The gas after leaving the purifier is then passed to the station meter, and then on to the holder.

Where benzol is removed from the gas, the gas passes through a benzol scrubber before it reaches the station meter.

Holder Temperatures

It is customary in most gas plants to take temperatures periodically of the water seals in each of the holders. This includes temperatures in the tank and in each cup. The temperatures are taken more frequently in freezing weather to guard against the formation of anchor ice. When necessary, live steam is injected into the water to raise its temperature. For the purpose of taking the tank temperatures, a maximum and minimum registering thermometer, which will indicate the maximum and minimum temperatures over any particular period of time, is used. For taking cup temperatures a very sensitive type of insulated stem thermometer, range 30 to 180 deg. Fahr., is used.

The pressures maintained at the various points between the different pieces of apparatus are as follows: At the inlet to the primary condenser or washer-cooler a vacuum of about 2 in. of water is maintained. This vacuum overcomes the resistance through the seal in the hydraulic main. The exhauster puts a suction on the outlet of the primary washer-cooler of about 4 in. of vacuum and raises this to 28 in. water pressure on the outlet of the exhauster or the inlet of the secondary washer-cooler. There is approximately a 2-in. drop of pressure through the secondary washer-cooler and a 2-in. drop of pressure through the intensive scrubbers. The drop in pressure between the latter apparatus and the purifier depends upon local conditions. The drop through the purifier is about 10 in. of water pressure. The drop through the station meter is about 1 in.

At each of these points temperature and pressure indicating and recording instruments are applied. Pressure regulators or governors are also used.

The temperature range of indicating thermometer used at each of the various applications is the standard 40 to 140 deg. Fahr. graduated in 2-deg. divisions. The particular form of instrument, whether it be an angle, a right or left-side angle, a reclined or inclined face or a straight-stem form will depend entirely on the elevation and direction of the thermometer opening in the apparatus. The range of the recording thermometer should be given particular consideration; that is, a chart should be selected that will have a good factor of safety above the maximum temperature to which the bulb will ever be subjected, since if the maximum temperature on the chart is ever exceeded, the mechanism in the case will be strained. Temperature regulators for controlling the amount of cooling liquid in the primary and secondary condensers or washer coolers, as well as intensive scrubbers, will effect an economy in water consumption as well as maintain uniform temperatures.

Particular care should be exercised in specifying

cast-iron separable sockets to protect the bulb of either the indicating, recording or temperature regulator, so that the bulbs of these instruments will be protected from the corrosive action of the ammonia present. It is desirable to have the capillary of the recording thermometer and temperature regulator covered with lead, and to have the instrument case coated with paint that will resist the ammonia fumes, in order that these instruments will give proper service.

For indicating pressures at the different points between the apparatus as wel las to indicate the flow through Venturi meters used for measuring gas or for measuring air in the combustion of producer gas, the Ellison type of draft gauge finds application. Where the pressures are above 3 in. of water, the U-tube form of pressure gauge used to indicate the existing pressure.

Taking Care of Distributing System

U-tubes to indicate main and service pressure and recording instruments for maintaining a continuous record of these pressures are quite universally used. Without instruments of this kind no distribution system can properly be taken care of. At the inlet and outlet of each governor, at the ends of mains and at frequent intervals in the outlying districts, as well as in complaint work, these instruments find ready application.

A U-tube properly made should have a union connection to permit of connecting the instrument to the line without having to turn the instrument itself. The tube should have a red background so as to quickly and plainly show the water level. The case should be of rigid construction to withstand the rough usage it receives when carried around in a tool bag. Since in the majority of cases these instruments are applied in dark places, it is important that the graduations should be distinct and the figures of a size and color that they can easily be read.

The heart of a gas plant is perhaps the laboratory. In this department, continual tests are made to check up operations, and to determine whether or not the gas is of the proper composition to meet the existing standards, whether it be on a candle-power or B.t.u. basis. For this work, precision grade of instruments should be used.

In connection with gas, calorimeter thermometers especially made for the purpose and graduated to one-tenth of a degree are used. For inlet water temperatures, a range of 45 to 100 deg. Fahr. or its equivalent in Centigrade should be specified. For outlet water temperatures, a range of 60 to 110 deg. Fahr. is standard. For taking exhaust temperatures, a range of 40 to 120 deg. Fahr. is used. Thermometers for taking gas inlet temperatures should have a range of 40 to 120 deg. Fahr. while thermometers for taking room temperatures are to be had in a range from minus 20 to plus 120 deg. Fahr.

A wet and dry bulb thermometer in the form of a hygrometer or hygrodeik is essential in order to obtain the relative humidity of the air used to support combustion.

A mercurial barometer is an important instrument in connection with gas testing, since the volume of gas must be corrected, for variation in atmospheric pressure to standard pressures. An instrument of the recording type, called a stormograph, will maintain a record of barometric pressure, and is of value in a laboratory, not only for its indications of existing barometric pressure, but also because of the predictions of changes in weather conditions.

Another type of barometer known as the aneroid type is quite universally used. It is not necessary with this type of instrument to make any corrections for temperature changes, scale corrections or other corrections which must be made in the mercurial type. However, the mercurial barometer readings corrected for standard conditions is the more accurate instrument. The aneroid type is mechanically operated and contains a compensating device to correct for temperature changes.

In the manufacture of carburetted water gas, a boiler house which comprises identical equipment with that used in a steam power plant, finds application for temperature and pressure indicating, recording and regulating instruments.

For taking temperatures of the coal pile, a maximum registering thermometer is used. The usual arrangement is to insert iron pipes at particular points in the pile for taking temperatures at stated intervals, so as to keep a check on any continuous rise. If these temperatures reach 150 to 160 deg. Fahr. the coal pile should be removed, since otherwise ignition may take place and a considerable loss of fuel will result.

Influence of Boiler-Room Temperature

The temperature of the boiler room will have a bearing upon the operating efficiency of the boiler since the air to support combustion is usually taken from the room.

A wet and dry bulb instrument is often used from which to determine the relative humidity of the air, so that changes in operating conditions may sometimes be traced to this source.

The importance of maintaining feed water temperatures is quite universally recognized. It is estimated that for every 11 deg. rise in feed water temperature, there is an approximate saving of 1 per cent in fuel consumption. While an indicating thermometer is satisfactory for taking temperatures of feed water for ordinary purposes, a recording thermometer has a decided advantage, since it not only keeps a continuous record of the existing temperatures, but will also indicate evidence as to the cause of boiler-tube leakage.

Where feed water heaters are used, it is desirable to know both inlet and outlet temperatures. In the closed type of heater, a bi-record recording thermometer with one of its members applied to the inlet steam supply and the other to the outlet, will give records, which when compared with the readings of the inlet and outlet water temperaures will give information from which to determine the efficiency of the heater.

Similar applications of indicating and recording instruments are used in the water and flue gas inlets and outlets of economizers.

The use of a recording pressure gauge for taking main line steam pressure is quite common. The records from this instrument will give information to the superintendent in charge on the operation of the boiler house.

The importance of using indicating and recording thermometers for taking flue gas temperatures is commonly recognized. For every 25 per cent decrease in flue gas temperature there is an approximate increase of 1 per cent in efficiency. Some combustion engineers claim that the stack temperatures in conjunction with operations of the boiler and fire tell them more about the operating efficiency of the plant than any other instrument. Additional infor-

(*Continued on page* 375.)

American
Gas Engineering Journal

SIXTY-FIRST YEAR

Published Weekly by AMERICAN GAS LIGHT JOURNAL, INC., 150 Nassau Street, New York, N. Y.

ELBERT P. CALLENDER, Pres. S. G. KRAKE, Vice-Pres.-Treas. A. M. GLEASON, Sec'y

EUGENE C. MILES, Editor

Subscription $3.00 per year, including postage in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents

Contents of This Issue

GREAT FUNDAMENTAL ECONOMIC QUESTION WHICH FINALLY MUST SETTLE ALL RATE CONTROVERSIES NOT YET TOUCHED UPON—BY L. W. ALWYN-SCHMIDT 361

DISPOSAL OF WASTE FROM GAS PLANT 363

INVESTIGATIONS SHOW CAMPAIGNS ARE SUCCESSFUL IN ACHIEVING RESULTS 366

SUPSTITUTE FOR HUMAN SENSES HAVE WIDE VARIETY AND MAKE FOR ECONOMY IN GAS SUPPLY 367

EDITORIALS 371

NEWS OF THE GAS INDUSTRY 377

As the Journal Views It

A Double Interest in Forthcoming Convention

A double interest attaches to the forthcoming convention of the American Gas Association.

At its inception much was expected of it. Much has been accomplished.

But it started off under most promising conditions.

All partisanship was laid aside in the selection of its officers.

Not only did its first president not seek the office, but was actually and sincerely reluctant to accept it. It was typical of the spirit of self-sacrifice that existed that despite this reluctance he accepted the office and put his entire energies wholeheartedly into the task.

There was confidence that the association under him would succeed, because he was a man of proved accomplishment in big things.

George B. Cortelyou will go down in the history of gas association affairs as the father of the American Gas Association.

A promising infant was placed in his hands for upbringing, but, like all infants, subject to serious consequences from seemingly minor neglects or fault in technique.

A little too much self-opiniation in holding to his own idea as against those of others and valuable and powerful co-operation would have been alienated.

But great expectations were held out for Mr. Cortelyou. And he lived up to all of them. As a harmonizer of conflicting interests and ideas he has succeeded pre-eminently.

The second election of officers was almost a matter of routine.

The infant had not yet attained such vigor that it might with reasonable safety be entrusted to less certain hands.

This year the nominating committee evidently felt that it is now ready to be launched off on its own resources; else that further demands upon Mr. Cortelyou would be an unpardonable imposition.

One thing is certain: ample time has been given the permanent staff to get organized and get its bearings. It should now be so prepared as not to demand a great deal of guidance from the elective officers.

Manifestly there has been splendid co-operation between Mr. Cortelyou and Colonel Fogg. And encouragingly we have heard, in regard to association affairs, less in the last year of Mr. Cortelyou and more of Colonel Fogg.

If Mr. Cortelyou leaves behind him a secretary-manager who is capable of doing everything the secretary-manager of the American Gas Association should do it will be his supreme accomplishment in this task, for such will insure permanence and all else he has accomplished will amount to naught if he does not leave behind him an association that can endure, expound and progress.

The answer lies with the future and Colonel Fogg.

Signs of the Times

Younger men, and some older, in gas company employ complain of lacking the opportunity of self-expressing and of being denied the right to criticize.

Should such a condition exist in an anywise general degree it is a groundless survival of times that, to the gratification of all of us, are now history—times in which public utilities were the football of ward politics and had to gouge their patrons in order to survive the gouging they themselves were subjected to.

If there are any secrets of gas company financing or management in general that are able to dodge the probing eye and interference of present-day regulation, they exist simply by omission and because their importance is so little that no one ever thought of them.

The only objects any management nowadays could have in repressing its subordinates' desire to tell about what they are doing would be a doubt in its own competence or a selfish method to hold onto a valuable man at low compensation simply by preventing his value from becoming known to anyone except itself. No manager can ever hope to conceal his incompetence long by gagging off his subordinates' criticisms. Managerial incompetence soon reveals itself in its own acts. The policy that builds on holding down the individual by concealing his value is a policy that is as ruinous as it is unspeakably selfish.

A dictatorial or arbitrary attitude on the part of the head toward his subordinates is in popular disfavor these days. Teamwork and co-operation, getting the most out of the employee and getting him all that he is worth, is the aim and mark of success in management as we now view it.

Great Fundamental Economic Question Which Finally Must Settle All Rate Controversies Not Yet Touched Upon

(*Continued from page* 362.)

used only in small quantities and manufactured in a correspondingly small volume, or shall it go for the big field, making the largest possible quantities by reaching out for all consumers that can be induced to buy its product, and base its earnings upon the principle of small profits but a large turnover.

Both ways promise a certain success. One can very well see the gas industry following the first. It would mean an end to its practical development. Make just so much gas as can be produced with the existing equipment, raise from time to time the price of the product so as to make production profitable and sell to such consumers only whose demand and use justifies the comparatively high price that has to be paid for the article. There are people who use to-day the very expensive medium of cooking by electricity, just because they find it convenient and can pay for the luxury. There will always be people that will feel in the same manner with reference to gas.

But the industry might just as well make up its mind to go finally out of business. I am sure the other plan will appeal more to the gas men of to-day. It is a plan which necessarily means fighting. It is a way that, if once decided upon, will not provide all easy going until it leads to complete prosperity on the other end. But where the first plan makes possible one plan in one district, two, three and more gas plants can be operated successfully with the second. There is no end to the uses to which gas may be put, provided always it can be had at the right price, which is a price lower than that of any other heating or firing material.

The Parting of the Ways

Gas men, therefore, should ask themselves whether the present policy of applying for higher rates should not be changed rather to another one, which seeks to readjust the doubtless just now not very favorable position of the gas works by adding to their output and by putting to use some of the waste materials that are now forming a positive loss to the gas works. The plan may sound fantastical enough to those of our gas men of the so-called "safe" school of manufacturing. But the fact that a plan sounds fantastical by no means is an argument against its practicability. Joffre beat the Germans by running away from them until he reached the Marne, where he met them upon a ground selected by himself for his purpose. Success was not obtained by the safe and sane method but by choosing the daring expedient in a desperate situation.

Such a policy has the additional advantage that it gives to the gas works a completely new field of operation. Where they have sold gas only, they can now

branch out in the whole field of chemical production with its wide commercial possibilities. The growth of the American chemical industry is by itself an example in favor of selecting the second plan. By the daring imagination of the men leading it it has created a market not only for the basic products of gas making but also for many advanced derivatives of coal carbonization that could not be sold at any price a few years ago. There is no need for any gas plant to follow the trodden path. Several gas plants might combine for using one of their by-products in a special factory. They are not bound in this part of their employment by the rates presented by a public service commission, but they may enter national competition as free as any other manufacturer.

Who can say whether in a very few years the gas itself will not become the by-product that can be sold to the gas consumers at the very lowest rates in view of the necessity of manufacturing new products of coal for which there is a better paying demand?

With the price for motor spirit, for instance, standing where it is now, it is not at all an impossibility to manufacture benzol from coal and let the gas take care of itself. But, whatever the direction of the development may be, gas is its controlling force and the gas companies hold in their hand the key to the situation. It is essential that they should not themselves close the door against their first large commercial opportunity that has come to them since many years.

Investigations Show Campaigns Are Successful in Achieving Results

(*Continued from page* 366.)

Eighty per cent have conducted campaigns in the past. Twenty per cent have not. (Of this 20 per cent practically all were smaller companies, many of which have no sales force. Of those who have conducted campaigns, 89 per cent considered them successful; 10 per cent considered them unsuccessful; 1 per cent were non-committal. (In general, those companies who were not successful in their campaigns were small companies, although in one or two cases the reason given for their failure to be successful was that the campaigns were handled improperly by a special sales crew furnished by an outside company.)

Again, of those who replied, 63 per cent believe it is to their advantage to adopt some form of sales campaign program. Thirty-four per cent could see no advantage in doing this. Three per cent were non-committal. (Of those who did not look favorably on the campaign plan, the reason seems to be either that they do not sell appliances at all or they consider that their companies are too small to campaign, or present unsettled conditions force them to put off action along this line until later.)

As regards the schedule adopted by the association at last year's convention, 63 per cent advised that this schedule could be used successfully by them and that they would adopt it. Twenty-five per cent advised that they believed that it could not be used successfully by them. Twelve per cent were non-committal. (The general opinion of those not favoring the schedule is that it is too elaborate, although companies in the South and Far West claim that it is not applicable because of climatic conditions.)

In general it might be said that the majority of our companies are committed to the sales campaign idea and believe that the association schedule can be used successfully.

However, because many of the companies seem not to have grasped the sales schedule plan and its possibilities, the committee feels that the following pertinent explanations should be made:

1. The association schedule as adopted and recommended to member companies should not be considered obligatory and should be used only as a model in the planning of sales and campaigns.

2. No company should feel that it should adopt more of the schedule than its sales department can handle successfully.

3. The twelve primary sales as featured in the schedule should be considered first and effort made to run successfully as many of these as possible, using the Suggestions for Secondary Weeks only where practical.

4. There should be no hesitancy on the part of any company to adjust the schedule so as to fit its own local or climatic conditions.

5. No company which sells appliances should consider itself too small to adopt at least a part of the schedule and sell the appliances which it does handle through the campaign plan.

6. The committee can see no reason why every gas company should not become committed to the sales campaign plan and adopt a schedule of some sort, even though the association schedule may be at variance with their ideas.

7. The association schedule should be looked upon as a model, and once a campaign program is put into successful operation added activities should be considered and the model more nearly approached, until as complete a schedule as possible can be successfully handled.

Your committee wishes to re-emphasize the fact, brought out by last year's committee, that "the prime object of special sales campaigns is to stimulate activity, to arouse the interest of our customers and to bring our goods forcefully to their attention. A successful sales campaign requires organized, concerted action. It must be well planned and heartily supported by interallied departments. Continuous drives and strenuous efforts through sales campaigns prove of inestimable value." Further comments in support of this statement as given by member companies are of interest:

Results from Concentration

"A campaign well planned, well advertised and comprehensively supported by all departments in the company is certain to increase sales."

"Concentrated effort always brings results."

"A special appeal attracts and interests the public, where general hit-or-miss advertising will not."

"Through special campaigns the right appliance is brought to the attention of the customer at the right time."

"When advertising in a campaign is done well, its value remains long after the campaign is over."

"In short, snappy, well-handled campaigns many prospects are uncovered whom the company would never learn of ordinarily, some of whom are sold immediately and others of whom will buy in the future."

"Stimulation of sales always follows any extra

effort on the part of the companies selling."

These terse sentences point out emphatically the viewpoint of the companies themselves as to the value of sales campaigns.

The gas lighting committee suggested that a revision be made in the association schedule for the month of September so that under "Suggested Activities for Secondary Weeks" attention might be given to the matter of putting in shape and maintaining customers' gas-lighting equipment.

This revision is covered in the following schedule, which the sales campaigns committee recommends for adoption by the association:

Recommendations for Primary Sales Weeks	Suggestions for Activities for Secondary Sales Weeks
JANUARY	
1st Week—Clearance Sale	
2nd Week—	Baking displays—bread
3rd Week—	Baking displays—pies
4th Week—	Baking displays—cakes
FEBRUARY (Also September)	
1st Week—Gas Room Heaters	
2nd Week—	Architects', contractors' and builders' exhibition
3rd Week—	Cake griddles
4th Week—	Stove oil or Rustoff
MARCH	
1st Week—Gas Ranges	
2nd Week—	Broiling
4th Week—	Convenience of hot water
3rd Week—	Hygiene of hot water
APRIL	
1st Week—Gas Water Heaters	
2nd Week—	Boiling
3rd Week—	Waffle irons
4th Week—	Comparative cost of gas, coal and other fuels
MAY	
1st Week—All-Gas Kitchens—Range, Water Heater, Room Heater, etc.	
2nd Week—	Cooking utensils
3rd Week—	Oven dinner cooking
4th Week—	Gifts for the June bride
JUNE	
1st Week—Modern Laundries—Gas Irons, Mangles, Laundry Stoves, Clothes Washers and Dryers	
2nd Week—	Boiling clothes
3rd Week—	How to care for water heater
4th Week—	Preserving and canning demonstration
JULY	
1st Week—Gas Incinerators	
2nd Week—	Three-piece-set saucepans
3rd Week—	How to care for gas range
4th Week—	Sadiron heaters
AUGUST	
1st Week—Gas-Stove Lighters	
2nd Week—	Solid top to gas range
3rd Week—	Toasters
4th Week—	Fireplace heaters
SEPTEMBER (Also February)	
1st Week—Gas Room Heaters	
2nd Week—	Reasons for variation in customers' gas consumption at different seasons of year
3rd Week—	Overhauling lighting equipment
4th Week—	Housepiping and maintenance New lighting equipment
OCTOBER	
1st Week—Gas Lighting	
2nd Week—	How to care for gas lamps
3rd Week—	Commercial gas lighting
2nd Week—	Gas table lamps
NOVEMBER	
1st Week—Gas Lighting Fixtures	
2nd Week—	Store lighting
3rd Week—Christmas Gifts	
4th Week—	Christmas gifts
DECEMBER	
1st Week—	Christmas gifts
4th Week—	Christmas gifts
3rd Week—	Christmas gifts

For the four odd weeks in the year Service

Your committee has concentrated its efforts this year in endeavoring to get member companies committed to the sales campaign idea. With that in view, letters were written to all member companies. To all who sent in replies to this first letter, the committee wrote personal letters endeavoring to give assistance to those who desired it and asking for detailed information on successful campaigns.

We are sure that member companies who conduct successful sales campaigns are very anxious and willing to assist the other companies that have had less success and that are "hungry" for good selling ideas. If careful records of campaigns are kept in detail, plan of campaign shown, actual results given, costs and profits tabulated, and samples of advertisements, circulars, letters, etc., included, and then compiled into a complete report and forwarded to the association, this would prove of great value. Our association, like most others of its kind, has as a fundamental background the "exchange of idea" plan. The exchange of successful campaign ideas and plans cannot but be helpful to the industry at large, and the committee sincerely hopes that member companies will consider this seriously and assist the association in its endeavor to be of real service.

The present report brings out clearly that the majority of our companies are "sold" on the campaign idea, and it is our opinion that the balance can be "sold" with reasonable effort. Your committee considered certain recommendations which it found not

advisable to consider during the present year, and passes these on to the succeeding committee.

These recommendations are as follows:

1. That complete campaign plans be worked out covering the sales of the twelve primary appliances featured in the schedule, and that these plans, together with window display suggestions, be published in each issue of the *Association Monthly* sufficiently in advance to allow member companies to use these plans at the times set forth in the schedule. When the complete set has been presented, it is recommended that these be compiled into one volume for distribution to the companies.

2. It is recommended that the committee have prepared a series of pamphlets, similar to the canning folder, that can be sold to member companies for customers, these folders to point out clearly the proper use of the gas range, the water heater, the room heater, etc., and emphasize the feature of twelve months' use of appliances.

We learn from the committee on filling in the valleys of gas and appliance sales that the companies that are making the best showing in appliance sales are the ones showing the best gains in send-out. This confirms emphatically the opinion of your committee that the most successful companies are those companies with live selling organizations that plan their work carefully and run their sales departments on a thoroughly systematic basis.

In conclusion, let us point out that the development of the gas industry must come from the efforts of the selling force. A great responsibility, therefore, is thrown on the shoulders of our sales departments and we must pay strict attention to proper methods of attaining that development. Twelve months' selling of appliances to burn twelve months of the year (twelve plus twelve, the sales development slogan) is the real answer.

The committee feels that all companies can and should commit themselves to the sales campaigns idea, and that they should use a preplanned schedule of some sort. If the association schedule is adaptable to your needs, the committee urges that you use it, even though you revise it to fit conditions or shorten it because it is too complete.

But feeling, as it does, that the life of the gas business depends on the increased sales of appliances, and that the maximum sales are only possible through intensified selling, your committee believes and recommends that all companies consider the campaign plan very conscientiously and that they run campaigns continuously throughout the year, with some preconceived idea as to what they desire to accomplish. Whether campaigns are run weekly, biweekly or monthly, run them; and put every effort possible into making them successful. Use the schedule as an ideal to be gradually approached until you can adopt and successfully handle it in its entirety, or that part of its entirety which fits your conditions.

Snbstitutes for Human Service Have Wide Variety and Make for Economy in Gas Industry

(*Continued from page* 370.)

mation from the use of such instruments, such as indications of dirty tubes, leaky baffles, poor combustion, leaks through setting, leaks through bridge walls, etc., can also be determined.

An Ellison draft gauge is used for draft indication and to determine the resistance through the fire bed and through the boiler setting. Recording draft and vacuum gauges are usualy used in connection with the indicating types of instrument.

There are several additional applications for recording instruments, such as on the blow-off line to indicate the frequency and the length of time that it takes the boiler to blow down, and to indicate a leaky blow-off valve.

On atmospheric relief valves recording thermometers are used to indicate the frequency and length of time that the relief valve operates. On hot-water return lines from the heating system recording thermometers are used to indicate trap leaks, etc.

Pressure regulators are used in the boiler plant to control speed of steam-driven fans to increase or decrease the draft ending upon the pressure in the main line.

Where the piston type of stoker is used and the steam pressures carried in the main lines are comparatively high, it is desirable to reduce this pressure by the use of a pressure regulator in order that the stoker mechanism may not be damaged by excessive and fluctuating pressures.

In the gas house of carbureted water-gas manufacture the most important point for temperature observation is in the superheater, since if the temperatures are too high there is a danger of not only melting down the refractory lining and checker work, but also the formation of flaked carbon or lampblack. The latter will deposit in the seal and on the refractory material, and will result in a decreased yield. On the other hand, if the temperatures are too low the oil will be incompletely cracked and will result in decreased yield and a waste of oil.

In water gas there is, of course, no ammonia present, and the only impurities to be removed are the oil tar and traces of sulphur. The oil tar is removed through scrubbers and condensers in much the same way as the coal tar is removed in coal-gas manufacture. The temperatures of the inlet and outlet of each piece of apparatus are as important in carbureted water-gas manufacture as in coal-gas manufacture. Such apparatus as exhausters, purifiers, station meters and holders are similar in function to the same pieces of apparatus described in coal-gas manufacture.

The manufacture of oil gas is perhaps more universal along the Pacific Coast States than in any part of the country. The process needs very little comment or explanation. However, it is just as important to maintain proper temperatures in the generator in oil-gas manufacture as it is to maintain proper temperatures in the superheater in the manufacture of carbureted water gas.

The apparatus required for removing oil tar and traces of sulphur is practically the same as that required in the manufacture of carburetted water gas, and the use of temperature and pressure indicating, recording and controlling instruments are likewise important.

In gas distribution work, an instrument known as a gas leak indicator is used to locate the source of gas leakage. This instrument is extremely sensitive, and will instantly detect the presence of gas. Its construction is based on the principle of diffusion of gases. An elastic metal chamber transmits its motion to the indicating hand when gases are diffused through a porous tile located in the bottom of the instrument.

When the indicator is brought into an atmosphere charged with gas, the gaseous atoms diffuse through the porous tile into the closed chamber with greater rapidity than the air passes out, thus causing pressure by increased volume upon the elastic surface of the chamber. The motion thus given is communicated to mechanism, which causes the index hand to move over the dial. The maximum effect of the gas is attained in two or three minutes, when the index hand ceases to move.

Radium — A New Element in the Safety Movement

Radium, the most mysterious and most powerful element known to science, which has the greatest power of all discovered sources of energy, has now been linked with the safety movement and will lend its power to the prevention of avoidable accidents. So great is its power that one gram is sufficient to raise a ton of water from the freezing to the boiling point. If one ton of it were harnessed to a ship equipped with 1,500 h.p. engines, the ship would be propelled at the rate of 15 knots an hour for thirty years.

Radium is best known to the world through it curative properties in the treatment of cancer and through its commercial value in making radium luminous material. The power of radium was made known only a few years ago through the efforts of a Polish woman scientist, and a French and an American professor. Radium now treats thousands of cases of cancer annually, preventing death and eliminating a great deal of suffering.

Radium's role in industry as a life saver is less spectacular, but perhaps even more important than it is as a therapeutic agent. The great mass of accidents in factories, in mines and in other industrial institutions where darkness is a creator of danger, are being eliminated through the newest invention of science—radium luminous material. Radium illuminated watches are familiar articles. The same material that illuminates these is now being employed in great factories on all power-line switches where fumbling might mean electrocution to the operator.

High-pressure gauges, which are installed as an insurance against dangers, are deprived of a great deal of their safety value through inconstant lighting. Their dependability as indicators is increased tremendously through making them safe 24 hours a day by the application of radium luminous material, which is invariably luminous in the dark. Steam gauges and water gauges of all sorts are making use of radium to increase safety.

Electric switches are often set in places which are unlit. This includes electric lighting equipment which is usually visible only after the light it controls has been turned on. A spot of radium luminous material on the bottom of switch makes them easily located in the dark, so that in emergency they may quickly be made use of.

Likewise, a fire alarm or a fire extinguisher is deprived of a good deal of its efficiency through being invisible in the dark. Radium luminous material acts as a quick locater for them. Telephones which are often necessarily found quickly in the dark in emergencies, various emergency call bells, and revolvers are made more useful through the application of undark. Gun sights, illuminated, insure accuracy of aim in the dark. The need of luminating poison bottles, so that they may stand out warningly in the dark has been demonstrated too often to need further dwelling on. An interesting safety device is the safe combination whose dial is radium luminated, so that no artificial light need be used for it.

The industrial uses of radium luminous material are many. Bolts that are necessarily attached to the dark underportions of machines and equipment are being touched with dabs of this luminous material with a consequent great saving of bloodshed. In mines where the carrying of oil lamps or the placing of electric lighting equipment is not feasible, radium has been found to be a boon to humanity. There are dark corners in the dark underground channels which miners must traverse, corners where danger lurks—these are made safe through the unvarying luminosity of radium.

While radium is the most valuable element in the world—a gram of radium, which is about a thimbleful, costs $120,000, as opposed to $150 for an ounce of platinum. So powerful is it when mixed with other materials that even the minutest particle is effective in making material self-luminous for years. It is this quality which makes radium luminous material commercially possible.

The great value of radium is due to its scarcity, and to the great difficulty in isolating it after it has been found. Much of the radium of the world is now found in America, in carnotite fields. A great portion of this comes from the Undark Radium Mines in the Paradox Valley of Colorado.

The ore is found in narrow seams in the ground. It is sorted and packed in 100-lb. sacks and transported sixty miles to the nearest railroad station on the backs of burros and mules. Thence it is shipped in carload lots 2,900 miles across the continent to an extraction plant in Orange, N. J.

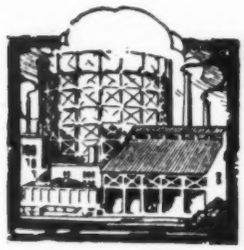
Two hundred fifty tons of ore treated with an equal amount of chemicals and water yields one gram.

The power of radium lies in the penetrating character of its rays, which disintegrate and travel at the rate of 3,000 miles a quarter of a second.

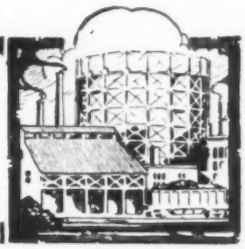
In addition to the use of radium luminous material on machinery in industrial plants, it is used extensively for the marking of any corner or spot which should be visible in the dark. Angles of tables and chairs, corners in rooms, numbers to indicate cubby-holes or doorways on which there is no other illumination are touched with a spot of undark. Even the valuable electric torch increases its efficiency when it has a touch of radium on it so that it can be reached instantly in an emergency in the dark.

When other lights fail, when fuses blow out, wires break down—radium will glow dependably without danger of explosion or of burning.

The employment of radium to help solve our medical and industrial problems of life safety is as yet in the first stages of its development. What the future will bring, no one knows.



NEWS OF THE GAS INDUSTRY



N. Y. Consolidated Maintains $7 Dividend Rate Despite Rising Costs

New York Consolidated Gas shares are among those to which public attention recently has been attracted. This is the result of widespread belief that with a drop in commodity prices those companies which have had their earning power limited by rate-making bodies on one hand and high operating costs on the other would materially benefit from changed conditions.

While this was true of Consolidated Gas for the major part of recent abnormal years, the rate decision obtained by the company early in August insured it against further operations without commensurate return.

Under ruling of Judge Hand in United States District Court the company is permitted to charge $1.20 a thousand cubic feet until March 1, next. This is an increase of 50 per cent over the 80-cent rate provided by the State law.

The $1.20 rate was fixed by the court on basis that the company is entitled to earn return of 8 per cent on the property invested. The court estimated that the new rate, plus a loss of $800,000, would return the company net income of $7,600,000 a year an output of 19,000,000,000 cu. ft. of gas.

This income, providing costs were no higher than 80 cents a thousand, would mean profits of about $7.60 a share. However, the decision covered only 60 per cent of the Consolidated Gas properties and the companies not involved in the litigation have started separate actions to have the 80-cent gas law declared unconstitutional.

In addition to profits from its gas business, the parent company has large sources of revenue in its investment in other gas and electric companies in New York City, notably New York Edison. In year ended Dec. 31, last, the company received $7,449,635 in dividends and interest on loans from these subsidiaries.

This is equivalent to additional $7.40 a share on parent company stock. Combined with estimated yield of $7.60 a share as result of the increase in rates, this would bring earnings up to about $15 a share. Interest charges amount to about $1,500,000 a year, balances being equal to about $13.50 a share. In the year ended Dec. 31, last, the company reported earnings of $4.11 a share.

Although Consolidated Gas earnings, like those of all other utility companies, have been very much reduced since beginning of the war as a result of high operating costs and a fixed rate for its product, the regular $7 annual dividend rate has been maintained. In addition the company has gone ahead with normal expenditures of maintaining plants and making necessary additions without increasing funded debt.

Public Utilities Will Pool Coal

The big public-utilities corporations of New York City will pool their supply in favor of less fortunate smaller utilities, so that there will be no cessation of work, was decided at a meeting of the New York Fuel Distribution Committee before Public Service Commissioner Lewis Nixon.

As soon as this decision was reached five New York utilities corporations agreed to supply sufficient coal to the New York & Richmond Gas Company to meet its wants.

The personnel of the committee is J. W. Lieb of the New York Edison Company, chairman; Walter R. Addicks, Consolidated Gas Company; C. Andrade, president of the Wholesale Coal Dealers' Association; R. H. Nexsen, chief electrical engineer of the Public Service Commission; M. S. Sloan, president of the Brooklyn Edison Company, and W. J. Walsh of the New York and Richmond Gas Company.

The committee agreed on a weekly questionnaire to be sent to all coal users. Utilities corporations will be required to state: Coal received during the previous week, amount of fuel used as against that received, amount of coal on hand each week, the number of days' supply on hand each week, and give notice of the change of name of any contractor who supplies coal to them.

$1.90 Gas Rate for Patchogue

The Public Service Commission, second district, has authorized the Patchogue Gas Company, Patchogue, L. I., to charge consumers in Patchogue and Bellport and the town of Brookhaven $1.90 a thousand cubic feet for gas for light, heat and power, and in addition thereto a regular service charge of $1 a month, and temporary customers taking its service for a period of only four months or less a year a further and additional season service charge of $6 for the period.

The rates the commission has determined, as just and reasonable maximum rates for one year and thereafter until the further order of the commission. The company is directed to prior to Nov. 15 read all meters, and on and after these readings to charge the new rate following filing of a new schedule with the commission, effective on three days, notice after meter readings are completed.

The order followed an investigation by Commissioner Frank Irvine of complaints of the trustees of Patchogue and the Brookhaven town board against rates effective on Oct. 3, 1919, increasing its rates 25 cents for each block and increasing the minimum charge from 60 cents to $1 a month. The company, during the investigation, asserted that costs had greatly increased since the inception of the complaints and it amended its answer, adding a request that the commission fix a price in accordance with circumstances then existing.

Commissioner Irvine, in a memorandum, discusses the valuation of the company's property. The fixed capital was placed at $149,000, including $20,000 as the value of a water gas plant, which has not been in use for several years. Commis-

sioner Irvine says the consumption of gas is much greater in summer than in winter because a large part of the consumers reside in the company's territory only during the summer months and to meet this peak the water gas plant must be used in summer to augment the supply purchased from the Long Island Company or another transmission line must be built in order that the supply from that company may be increased. The use of the existing plant, the commission holds, will be much more economical, and it should also be used for stand-by purposes. Therefore its value should be included in the rate base, but in adjusting the rate the burden of carrying it should if possible be imposed largely upon the summer consumers.

Laclede Earnings Will Show Increase for Coming Year

Among the public utility companies which stand to benefit from any decline in the costs of materials and operation is the Laclede Gas Light Company of St. Louis, whose gross earnings have been steadily increasing. This will be the first complete year that the company has operated under the advanced gas schedules, which went into effect in the summer of 1919, and final net earnings are expected to show considerable improvement over the 1919 results, when only 1.32 per cent was shown for the common stock. The company has been handicapped by the rise in the ratio of operating expenses to gross earnings, the ratio which for years held below 50 per cent having risen since 1915 until, in 1919, it was 60.54 per cent. At the same time, annual requirements for bond interest have increased from $1,055,405 in 1913 to $1,608,373 at present, the difference amounting to about $5 a share on the common stock.

40,000,000-Ft. Gasser in Fox Field

The Humble-Fox gasser, which blew itself in recently and threw the tools over 300 ft. into the air, is now making a production of over 40,000,000 cu. ft. of gas. The operators have succeeded in putting on a gate valve, but cannot close it for fear of having strings of casting blown out of the hole. The anchor blocks are being run in and will be cemented immediately. The gas is shooting high over the derrick.

Attempts to Cap Mammoth Gas Well Result in Four Fatalities

The gas well belonging to the Midwest Refining Company, 60 miles southeast of Yellowstone National Park, in Buffalo Basin, Wyoming, which caused the death of three men by asphyxiation a month ago, has recently taken an additional toll of life, killing one man and injuring four others as a result of its accidental ignition and explosion.

An attempt was being made to cap the well at the time the gas ignited and in twenty minutes more the work would have been completed. The force of the explosion was so great that one man was blown across the pipe and out of danger, else he would have been burned to a crisp in a few seconds.

Two attempts to shoot the well with nitroglycerine in an effort to extinguish the flame, have failed for the reason that the three-quarter-inch steel cable suspended over the flame from two derricks from which it was proposed to drop the explosive, melted before it could be accomplished.

It has been asserted that this is one of the largest gas wells in the world as it is estimated that 140,000,000 cu. ft. of gas is burned in twenty-four hours, which is only one-tenth the fuel volume. The roar of the gas escaping from the partially-capped pipe is deafening and the heat is so intense that it is impossible to get within one hundred feet of the blaze. The smoke from the gas ascends in curious spirals, making a wonderful spectacle which is bringing visitors from all sections.

The asphyxiation of Enoch A. Morris, W. M. Kline and Rudolph Stahl, employees of the Midwest Refining Company, a month ago brought to a halt efforts which have been made for a period of six years to drill through the gas sands in Buffalo Basin. The gas pressure throughout that vicinity is tremendous and attempt after attempt has been made to drill through the gas stratum to the oil which it is believed underlies the field.

Kline, Morris & Stahl had made the most nearly successful attempt drilling for the Midwest. They had reached a depth of 2,200 ft. and had about 400 ft. more to go, it was thought. They were just completing the setting of an 8-in. casing, within a 10-in. casing, on the day of the tragedy, and two men who were working under Kline's direction placing the packer which would cut off the flow of gas from the well, had been in the pit under the rig most of the morning working on a platform which was about 7 ft. below the surface. As the gas was beginning to choke them, they came to the surface, and Kline, believing that but a few minutes would finish the work, decided to go down alone and complete the task. He was urged by the two men who had just come out of the hole to tie a rope around his body in case of emergency, but this Kline refused to do. He was still on the ladder leading to the platform when he collapsed and fell, lying on the edge of the scaffold.

Morris and Stahl cried out that they would get him and pass him out of the hole to the other two men. Instant action seemed imperative and neither man stopped for a gas mask, although they were available. The would-be rescuers were overcome as quickly as Kline had been and all three bodies rolled from the platform to the bottom of the pit.

The other two men then donned gas masks, and with considerable difficulty rescued the bodies. Death is thought to have been instantaneous in each case.

Holland Bond Issue Declared Contrary to Law

The city of Holland, Mich., proposed $150,000 bond issue with which it was to purchase the local gas plant has been declared contrary to law by Attorney General Groesbeck, who has notified City Attorney McBride that Holland must comply with the sinking fund requirement of the home-rule law before the bonds can be legally issued.

The local gas plant is owned by the American Public Utilities Corporation, and the gas question has been a political issue for many years. Mayor E. P. Stephan was elected on a platform which stated that the gas question should be solved. The council, following his election, immediately took steps toward a purchase of the plant. The proposed bond issue for its purchase will come up at the November election.

Increased Rates Granted

The Illinois Public Utilities Commission in a recent decision granted an increase in rates to the Princeton (Ill.) Gas Company, the new schedule is as follows: Illuminating, per 1,000 cu. ft., $2.10 gross, $2 net; commercial, per 1,000 cu. ft., $1.85 gross, $1.75 net.

Coal and Food Commission Fixes Total Amount of Coal to Be Produced in Indiana

Commission Has Power to Compel Mines to Produce Enough to Supply Demand

Jesse E. Eschbach, director of the special coal and food commission, which has fixed prices under the new Hoosier law for coal originating in Indiana as well as retailers and middlemen's profits, has just acted under other terms of the law to fix and establish the total amount of coal to be produced by the various mines in the State. This action is the most drastic ever taken with regard to the utilization of a natural resource in Indiana by the public. The new law gave the commission the right to determine the average consumption of coal in the State and to compel the mines to produce enough to supply the demand.

An order, just promulgated by the commission, estimates that an average of 1,600,000 tons of coal per month is consumed during this season of the year in Indiana. The coal operators immediately took it for granted that this fixing of the consumption meant that a total of that much was to be produced by Indiana mines. In a public statement, Mr. Eschbach pointed out that the figure given included all foreign coal shipped to Indiana. Then he proceeded to estimate the total necessary production of each Indiana mine and ordered the mines to produce that much.

Speaking with reference to the order, Mr. Eschbach said:

"The commission fixed the prices for coal at all the mines in Indiana and not one operator has appealed to the courts. Since the order fixing the price of coal at the mines was made, the operators generally throughout the State of Indiana have had better running time than for many months preceding, and the prices will yield everyone of them at least a fair profit.

We had hoped that all of the operators would make their own distributions and would be entirely fair with the Indiana public and give to Indiana the share of their coal which Indiana normally takes and to which it is fairly entitled. Some operators have done this and have co-operated with the commission, but it has developed that many of the operators have seen fit to withhold their coal from the Indiana market, and it became necessary for the commission to take cognizance of this fact and act as best it can to remedy the situation.

Under the special coal and food commission act, there are two provisions which we have considered in this connection. Section 9 of the act gives the commission the power and makes it its duty to require all operators in Indiana to produce and sell, or offer for sale, in Indiana, a sufficient quantity of coal to supply domestic demands, and permits the commission to order each operator to offer for sale in Indiana a fair proportion of the total amount necessary to supply domestic demands.

Section 20 of the act provides that in case of emergency, the commission may order the different operators to deliver certain quantities of coal to certain named users of coal in the State.

An order upon all operators to offer for sale in Indiana a certain tonnage has seemed more fair to the commission than an order upon certain operators to supply certain named consumers, and the new order just issued by the commission is based upon section 9. Under order No. 8, just issued, every operator in the State is required to mine enough coal over and above his interstate and railroad requirements to permit him to sell, or offer for sale, in this State, a certain specified number of tons which we have endeavored to fix upon a fair basis as between the different operators. It is now up to the retailers and other consumers of coal to get their orders into the operators' hands so that when the operators offer for sale in this State the coal specified, there will be buyers for it. In order to avoid confusion and the placing of too many orders with some operators and too few with others, the commission has suggested to the different retailers, the operators with whom they should at once place orders for coal, and we have endeavored to arrange these suggestions in such manner as to send orders to all mines in proportion to the amounts which we have required they offer for sale in Indiana. We have taken into consideration the distances all coal must be shipped and have tried to place the orders from the most distant consumers and retailers with the group of mines which carry the lowest cost at the mines, thus the higher freight rates will be attached to the cheaper coal and make all coal bear an average cost at its point of destination.

We believe the increased freight rates will result in a very marked increase in the consumption of Indiana coal within the State of Indiana, so we have suggested to each retailer who has had business connections and purchased coal of Indiana operators in the past that he at once renew those relations, and we believe many new business connections between retailers and operators will be established which will continue permanently into the future and give our operators increased business within our own State.

We are urging retailers everywhere to increase the market for Indiana coal in their communities and in this movement we hope to aid in every way possible.

Under the law, operators refusing to offer for sale in Indiana coal required, will have their licenses revoked unless, after notice and hearing, they can show adequate grounds for their failure. If we find it necessary to revoke the license of any operator, in justice to Indiana consumers we will be obliged to take every step necessary and exhaust the powers of the State to see that such operator discontinues business, but at the same time will attempt to see that such mine continues operation under receivership or otherwise and the coal from such mine made available to the people of Indiana.

We still hope that no emergency will arise which will make it necessary for the commission to issue orders under section 20 of the act for any operator to supply any named consumer with coal.

The commission and consumers have been patient, we have pleaded for friendly co-operation and we still plead for such, but the Special Coal and Food Commission act is the law of the State of Indiana and a great State must and will see that its laws are obeyed.

There is no reason why a large part of one class of our citizens may wilfully disobey the law of the land while all others must yield strict obedience thereto.

Lone Star Gas Co. Typical of Successful Natural Gas Enterprise

The natural gas business is allied on the one end to the oil industry and on the other to public service corporations. It is a dual business. The chief function of the natural gas companies is to get gas either by buying it or by producing it, and to transport this gas to the various cities which use it for fuel, light and heat.

The Lone Star Gas Company of Texas is one of the best examples of the successful companies engaging in this line of business. This company at present supplies gas to the inhabitants of thirty-odd north Texas towns and cities, including Dallas, Fort Worth, etc., with a population of more than three-quarters of a million people. It does not sell gas direct to the consumer, but brings it to or near the corporation limits of the various municipalities and there delivers it to the local distributing companies. The usual arrangement in regard to price is that the supply or transportation company receives a certain per cent of the gross sales. In the case of the Lone Star Gas Company the latter usually gets 66 2-3 per cent of the gross amount received by the local or retailing company.

To bring in this gas the company has an extensive system of pipe lines from the various Oklahoma and Texas gas fields. To get this gas the company is constantly seeking new gas pools and drilling many gas wells, and it also buys large quantities of gas; in fact, it buys more than it produces, which is often the case with large natural gas companies.

The Lone Star system of pipes includes altogether about 500 miles of major pipe; that is, ranging from 10 to 18 in. in diameter. The cost of the pipe and "laying" of same nowadays is often more per mile than railroads cost per mile ten or fifteen years ago. For example, an ordinary 12-in. gas pipe line to-day might easily cost $25,000 a mile. The Lone Star has three main supply systems. One goes almost due north from the city of Dallas into southern Oklahoma, a distance of approximately 125 miles, into what is known as the Fox district. The second main supply line goes northwest from Fort Worth, Tex., through the north Texas gas fields into the Walters and Duncan gas fields in southern Oklahoma, a distance perhaps of approximately 150 miles. The third division of supply pipes is what is known as the West Texas system, and now extends to the east edge of the Ranger district in north central Texas. This West Texas system is brand-new, has only been running gas a short while, and cost the company more than $5,000,000. A part of the West Texas system is supply pipes to Waco, Corsicana and other central Texas cities.

A natural gas company drills many gas wells and consequently occasionally, and in spite of itself, would drill an oil well. All such companies in time show a tendency to develop a crude oil producing department. The Arkansas Natural Gas Company, which led a precarious existence upon its gas business in Louisiana and Arkansas, has made several millions of dollars during the present year through development of oil producing properties at Homer, La. The Oklahoma Natural Gas Company has always given some attention to oil in Oklahoma, and is to-day producing several hundred barrels daily. The Empire Gas & Fuel Company was merely a gas company at the time it was discovered in the Butler County, Kan., oil fields.

Two years ago the Lone Star Gas Company began giving attention to oil, and to-day has on output of approximately 1,500 barrels daily. The average for the first eight months of 1920 was more than 1,000 barrels daily. Lately the company has been completing wells on new properties in Oklahoma and Texas, which is increasing this output. The present oil producing properties were developed on a small initial investment and have since paid out. They represent a net gain made by the company of several million dollars. The company has approximately 90,000 acres of oil and gas leases.

The company itself owns approximately 100 gas wells and buys gas from a large number of other producers. It drills actively and constantly in its search for more gas, and also for oil, and at the present time has about thirty wells drilling.

By the end of the present year the Lone Star Gas Company will be supplying gas for approximately 85,000 to 90,000 meters. The average gas sale of the Lone Star has been about 30,000,000 cu. ft. in the peak months.

The Lone Star Gas is an old-line company so far as its stockholders and management are concerned. It was organized by old Standard Oil men in the beginning, and was managed for years by E. R. Brown, now vice-president and general manager of the Magnolia Petroleum Company. Its present manager is F. M. Lege, whose early training was under John M. Sealy, now president of the Magnolia Petroleum Company.

Many of the stockholders of the Lone Star Gas Company are up and down the Ohio River. Messrs. Treat and Crawford, of Pittsburgh, are large stockholders. The Midland Securities Company, which is in a manner an ally of the Texas Company, is the largest individual stockholder.

The company has been utterly free of promotion. It is capitalized for $10,000,000 common stock, and has no preferred stock, no bonds or other long-time indebtedness. The company has earned and paid 8 per cent dividends on the common stock for years. Its earnings for the last fiscal year were approximately $3,800,000. For the present year earnings will be between $5,000,000 and $6,000,000.

$1,000,000 Gas Deal

A deal wherein the San Diego (Cal.) Gas & Electric Company is to buy the power house of the San Diego Electric Railway Company for $1,000,000, and the heating plant of the United Light, Fuel & Power Company for $100,000, has been closed, subject to approval of the State railroad commission.

Application for permission to buy has been filed with the railroad commission by the gas and electric company. Application for permission to sell also is to be made to the railroad commission by the street railway company and the power company, it was stated.

H. H. Jones, president and manager of the San Diego Consolidated Gas & Electric Company, stated that the deal is for the power plants alone and that the company has no intention of operating the cars of the railway system. The gas and electric company is to furnish the street railway company with power to operate the cars.

W. Clayton, of the San Diego Company, confirmed the deal pending before the State railroad commission.

Chuctanunda Gas Co. Opens New Showroom

Monday, Oct. 11, the Chuctanunda Gas Light Company, of Amsterdam, N. Y., opened its new office and salesroom officially to the public.

The new office and salesroom is the old office, 33 Market Street, and the adjoining store, 31 Market Street, remodeled into one large showroom, with the bookkeeping department in the back on one side and the sales department on the other. The general manager's office and directors' room are in the old location, but have been remodeled and refurnished.

Where the wall was removed between the two stores a steel girder, with two steel posts supporting it, was placed; a new steel ceiling was put in the entire office. The steel posts are covered with oak, and four C.E.Z. lights decorate each post, making a very effective lighting scheme. Gas arcs and semi-indirect lights are used for the general lighting. A central steam-heating plant was installed, with gasteam radiators connected in on the line for spring and fall use and, incidentally, to demonstrate this idea to the consumer.

AN ATTRACTIVE CORNER OF THE NEW CHUCTANUNDA SHOWROOM

Opening week a cabinet gas range of the latest type was placed in one of the large show windows, with a sign reading as follows: "This cabinet gas range to be given away to one of our consumers opening week, Oct. 11 to 16. Come in and fill out a card; you might be the one to win it. Friday evening, Oct. 15, at 8 o'clock, we will draw the lucky number, so be on hand."

An advertisement to the same effect was run in the evening paper. Each consumer was allowed one chance to win the stove, but before being given the ticket to drop in the box he or she was asked to fill out a card with the following questions on it:

Name and address.
Have you a gas range? How old?
Water heater? Tank or automatic?
Fireplace in your house?
Do you use a room heater?
House piped for gas?
How many gas lights in use?
Do you use electric light?

In this way some very useful information for the sales department was secured. It was very interesting to note how sure each person was that his or her stove was very old and that a new one was needed and he or she hoped to win it. As only one out of the thousand that filled out the cards and took the chance could win it, the company has all the rest to remind of their need for a new gas range, and with this fresh information the salesmen should make a clean-up this fall.

Opening week close to $4,000 worth of appliances and fixtures were sold, owing in part to the stimulated interest in the free gas range and also to the fact that a special opening week discount was given which made the salesmen close up a lot of business that had been hanging fire.

Report of Subcommittee on Gas Securities, Investment Bankers' Association of America

The public utility gas companies during the past have enjoyed a growth parallel to other public service enterprises. The lack of visible or spectacular features in the industry, coupled with an apparent gradual decrease in use of gas for lighting, have given the impression that electricity is displacing gas in all uses and that its future function and growth is thereby greatly limited. The high prices of materials and labor that characterize the period since 1916, without the commensurate increase in rates, have reduced the net earnings of the gas companies and intensified the belief that the industry has only limited opportunity.

The fundamental causes of growth and expansion or solvency and permanency in any enterprise depend on the general use, utility and competitive value of the product it makes and the service it renders. A careful study of the status of the gas industry, its scope and its future, will demonstrate that basically it embodies all of the desirable features and that it must expand if the industries depending on heat are to obtain an economic fuel, or the homes to receive the advantage of an essential and most desirable form of service—heat at the turn of a valve.

The conversation of the fuel resources of the country depend in no small measure upon its correct utilization. Gas by its nature and mode of delivery makes possible the entire elimination of waste.

There are now in operation in the United States over 1,000 companies serving manufactured gas to between 45,000,000 and 50,000,000 people in some 4,600 communities. It is estimated that the total capitalization of all the public utility companies in this country is around $15,000,000,000 and it appears that of this amount something over one-fourth or approximately $4,000,000,000 is represented by the capitalization of artificial gas companies.

Due to the fact that electricity is now so largely used for lighting purposes, a fairly well established popular belief seems to have grown up to the effect that the gas business as a whole is declining. That this be-

lief is unfounded is shown by the fact that the total amount of gas sold in the United States has increased from approximately 118,000,000,000 cu. ft. in 1908 to more than 300,000,000,000 cu. ft. in 1919, or an average annual increase of approximately 13 per cent, the rate of annual increase being greater during 1919 than any preceding year.

While it is true that the increase in the use of gas for lighting purposes has not kept pace with the increases in the use of gas for other purposes, nevertheless it is a fact that at the present time the total volume of gas used for lighting is much greater than it was in 1908.

The art of making coal gas has so far advanced that the heating value of coal can be more completely utilized and more efficiently applied through first reducing the coal to gas than in any other way. The result is that in the future gas will be employed in constantly increasing degree in all processes requiring heat. Furthermore the many valuable products which may be obtained from coal are wasted when coal is used to produce heat in any other manner than by first extracting the gas contained.

Stability of the Gas Business

Gas is pre-eminent in the domestic cooking field for the reason that no other method of cooking combines the economy, cleanliness, and convenience of cooking by gas. There is no danger of a setback due to the elimination of gas from any given field of use as the effect of competition in the one field that gas was ever employed extensively and for which something else is better suited, viz., lighting, has been fully discounted and any setback which the industry might have suffered due to the extensive use of gas for any given purpose being discontinued is already behind us.

Future Growth

The gas industry is undoubtedly on the eve of its greatest development, due to the fact that it is rapidly being employed in increasing quantities for all sorts of industrial purposes where heat is required, and the industrial heating field offers the same opportunity to the gas industry that was found by the electric industry in the industrial power field.

Industrial plants that use heat in their processes of manufacture must have a flexible fuel to conform with modern methods of production. Fuel oil has been used in the past; the present and future prices of this commodity, however, make its use uneconomical; and the only other fuel adaptable to the same processes is *gas*. To supply this demand, which incidentally *must* be supplied, will give the gas manufacturing industry an impetus comparable with that which the developments of the electric motor afforded the electric industry.

The impression that the use of gas is gradually being supplanted by the use of electricity is no doubt due to the fact that the advantages of electricity for lighting and incidental small uses in the home have been popularized largely through the means of publicity. The fact is that for heating requirements, which undoubtedly in the aggregate greatly exceed lighting and power requirements, was is in no danger of being supplanted by electricity, as in the heating field gas is fully as clean and convenient as electricity and vastly more economical. The difference in economy in the use of gas and electricity for heating purposes is fundamental and is not due to any imperfections in electric heating appliances, which if 100 per cent efficient from the standpoint of converting all of the electrical energy consumed into the form of heat, would still be less efficient than gas heating appliances from the standpoint of utilizing the available heating value in the original solid fuel. For certain small domestic heating and cooking purposes electricity is adapted, but the amount of gas which would be consumed in the aggregate if gas were used for these purposes instead of electricity is infinitesimal and may be disregarded. Electricity is further adapted for certain industrial heating purposes where extremely high temperatures can only be reached by the electric furnace, but in the vast majority of heating processes there is no question of competition between gas and electricity.

Need of Eliminating Arbitrary Standards

Due to the fact that gas was at first employed principally for illuminating purposes, it rather naturally developed that many regulatory bodies fixed arbitrary standards of illuminating value for gas. As gas became more generally employed for heating operations and as the open flame burner was succeeded by the mantle type of burner for illuminating purposes, the matter of the illuminating value of the gas itself became of no importance, and it followed that in some localities a standard of heating value was substituted for a standard of illuminating value. It is now important that all artificial standards be eliminated and that gas companies be encouraged to produce gas as cheaply per unit of heating value as possible, irrespective of the amount of heating value contained in a given quantity of gas. The idea of selling gas on a heat unit basis has been largely advocated and is at present being employed to a considerable extent in England, but it has not been conclusively proven as yet that this system is entirely fair. It is, however, clearly apparent that gas should be produced as economically as possible in order that the ultimate consumer may be given the greatest value possible for his money and the greatest economy in the production of gas can only be accomplished by eliminating both the artificial standard of illuminating value and reducing the artificial standard of heating value to the lowest point consistent with economical production and good service to the consumers.

It has been pointed out that probably the most important field for the future development of the gas business is that of serving industrial heating requirements, and in this field satisfactory service may be rendered by a practically non-luminous gas. It will therefore be possible in producing gas for this class of service to dispense with the use of oil to a very great extent, and in many cases entirely, where the cost of the gas per unit of heating value is increased by the use of oil.

J. J. Borger, of Augusta, Ga., has been appointed superintendent of the Springfield (Mo.) Gas & Electric Company to succeed William C. Hill who has resigned to accept a position as manager of the Stuttgart division of the Arkansas Light & Power Company.

Mr. Borger has had considerable experience in engineering and operating work in connection with public utility companies and for the past eight years has held a position with a company at Augusta similar to the one he will fill in Springfield. He will arrive in Springfield the middle of October to assume his new duties.

Kansas Facing Natural Gas Shortage

All industries using gas in cities supplied by the Wichita (Kan.) Natural Gas Company have been warned by the Kansas Court of Industrial Relations to provide other fuel when the severe cold snap forecast by the Federal weather bureau hits Kansas soon. This action was taken following a conference of the court with representatives of the Empire Gas & Fuel Company, the pipe-line company.

The court's existing order that gas shall be used only for domestic purposes will be strictly enforced, it was announced. When the snap comes all industries will be immediately cut off, excepting the Kansas Gas & Electric Company, of Wichita, and the municipal plant at Winfield. These also will be shut off if the emergency demands, the court announced. Hundreds of plants will be affected.

Even with these measures it is not certain that consumers will have sufficient gas for heating purposes, representatives of the gas companies said.

The order does not apply to cities served by the Kansas Natural Gas Company, the court explained, because the increase in gas rates has already automatically shut off most industrial users.

Warning to Topekans to put up coal or wood stoves if they expect to keep warm in the snap have been issued by L. G. Treleaven, manager of the local distributing company.

Texas Power & Light Sells Gas Distribution Systems

The deal announced recently between the Texas Power & Light Company and the North Texas Gas Company, both of Denison, Tex., whereby the latter purchased and took over the gas distributing systems of the Texas Power & Light Company in Denison and Cleburne, involved a total consideration of $100,000, according to the bill of sale of the transaction filed recently at Sherman, Tex.

The sale stipulates that only the distributing systems in the two cities are sold. The Texas Power & Light Company reserves its real estate and plants connected with the manufacture and storage of gas in the two cities, as well as its franchises in the two cities.

Denison citizens recently voted to allow the North Texas Gas Company to take over the gas distribution business of the Texas Power & Light Company at Denison.

Forty thousand dollars of the consideratio nis cash, and the remainder is evidenced by two notes of $30,000 each.

Bureau of Mines Helps Solve Oil and Gas Problems at Experiment Stations

A complete account of the work being conducted at the U. S. Bureau of Mines petroleum experiment station at Bartlesvilles, Okla., is contained in the following report by A. W. Ambrose, superintendent of the station. The investigations being carried on there in the interests of petroleum economic efficiency and described in the report include oil-field development problems, oil recovery problems, evaporation recovery of gasoline from residual gas of compression plants, and various refinery investigations.

Mr. Ambrose says in his report:

"A few years ago (March 3, 1915) Congress passed a law providing for the establishment of ten mining experiment stations under the supervision of the Bureau of Mines. In 1917 the Secretary of the Interior decided that one of these stations should be devoted to petroleum, and in the early part of 1918 approved the establishment of the petroleum experiment station at Bartlesville, Okla., upon the condition that the city furnish the site for the buildings and guarantee $50,000 for the erection of the buildings. A building site of five acres and the necessary building fund was furnished by the Bartlesville Chamber of Commerce.

The buildings consist of an administration and laboratory building, both of brick construction. The former is a two-story structure of eight rooms. A large room occupying over half of the main floor is devoted to the library, reception room and clerical force. The remaining rooms comprise a drafting room and six offices occupied by the staff assigned to this station. The laboratory is a one-story brick building and contains a well-equipped chemical and physical laboratory, also a machine shop and mechanical laboratory. In addition to the main buildings there now are on the property an experimental refinery, a blue-print house and a storehouse. These latter buildings are all of sheet-iron construction.

Purpose of Experiments

"The petroleum experiment station at Bartlesville was established by the Bureau of Mines for the purpose of co-operating with those actively engaged in the petroleum industry. It might be termed a laboratory for practical research and for solving problems, devising new methods, preventing wastes, effecting economies and for collecting and disseminating information. Investigations are not limited to any one branch of the industry nor to any one part of the country. Wherever opportunities appear for increasing efficiency, whether in the drilling of wells, in the producing or transportation of oil and gas, in the storing, refining or utilization of oil and its products, they may be considered.

"Some of the investigative work conducted or under way at this station is described below:

"An extensive investigation of the evaporation losses on Mid-Continent crude has just been completed. The information has been prepared in the form of a bulletin which will be published by the Bureau of Mines. As a continuation of this, work will be carried on to devise practical means for preventing and saving the evaporation losses. The amounts of gasoline lost by evaporation from crude oil is enormous, as is shown by the estimate of a Bureau engineer, that 510,000,000 gal. of gasoline were lost by evaporation from Mid-Continent crude during 1919. State in another way, on the average of 6.2 per cent by volume are lost by evaporation from the crude in the Mid-Continent between the well and the refinery—that is, for 100 bbl. of crude oil produced 6.2 bbl. of gasoline are lost by evaporation. These particular losses can be materially reduced at a nominal cost, and the problem is now being attacked so as to provide means for avoiding the bulk of this loss.

Natural Gas Conservation

"An educational campaign is being carried on in several States for the purpose of demonstrating the efficient utilization of natural gas in cooking ranges. This brings before the public in a most forceful way the fact that a shortage in natural gas does exist, and the future supply is largely dependent upon its present economic use. Demonstrations are being carried on in various towns and at State and county fairs.

"It is planned to co-operate with the Mid-Continent operators to bring

about conservation of gas in field boilers. In this investigation field tests will be made to determine the possibilities of the use of low-pressure burners, proper design of fire boxes, insulation of boilers against radiation loss, etc. The possibilities of economy in this type of work are shown by the fact that one large operator in West Virginia reduced with little effort the average field consumption per field boiler of a drilling well from 115,000 to 37,000 cu. ft. of gas per day, a reduction of 68 per cent.

"The Bureau has published several bulletins and technical papers on the compression and absorption process for recovering gasoline from natural gas. The most recent work is the recovery of gasoline from residual gas of compression plants."

Savannah Gas Co. Petitions for Rate Increase

The Savannah (Ga.) Gas Company has filed a petition with the Railroad Commission of Georgia asking for an increase in gas rates. The petition to the commission is given in full:

To the Honorable, the Railroad Commission of Georgia:

The petition of the Savannah Gas Company, a corporation of Savannah, Ga., asking for an increase of rates, respectfully shows:

The revenue of petitioner is not sufficient to meet its expenses. Unless an increase in rates is granted, your petitioner will not only make no return upon its large investment for the year 1920 but will operate at a loss.

Your petitioner has operated at a loss every month in this year since April and, under the rates now in force, will continue to operate at a loss. It has been necessary for your petitioner to borrow from a Savannah bank a large amount to take care of the deficit in its revenue.

The Savannah Gas Company therefore respectfully requests authority from your honorable commission to put into effect the following schedule of rates:

First 10,000 cu. ft., or any part thereof, $2 per thousand.

Next 20,000 cu. ft., or any part thereof, $1.90 per thousand.

Next 20,000 cu. ft., or any part thereof, $1.85 per thousand.

All in excess of 50,000 cu. ft., $1.80 per thousand.

A discount of 10 cents per thousand cubic feet on all current bills paid on or before the tenth of the month following consumption. A minimum rate of $1 per month net.

Respectfully,
SAVANNAH GAS COMPANY,
By JOHN GOLDEN, Vice-Pres

Kirk Oil & Gas Co. Acquires 2,500 Acres in the Kentucky Fields

The Kirk Oil & Gas Company, with authorized capital of $350,000, mostly West Virginia money, has just been organized at Huntington and has acquired a tract of 2,500 acres in the Kentucky fields. Most of the capital has been paid in and the company will commence operations on a large scale at once, it was announced at the organization meeting. The concern has taken out a Kentucky charter.

The officers of the company are: President, Judge A. J. Kirk, of Paintsville, Ky.; vice-president, J. H. Meek, of Huntington; secretary, Charles A. Kirk, of Paintsville, and treasurer, J. H. LaBlanc, of Huntington. These with the following constitute the board of directors: G. D. Miller, of Huntington; C. M. Preston, of Ashland, and Thomas W. Harvey, of Huntington.

There is no stock for sale, it is announced by the officers. Drilling will be under the supervision of W. J. Rogers, well-known oil and gas man, as general manager.

Asks Oil Entente for All Nations

At the annual meeting of the Mid-Continent Oil and Gas Association held in Tulsa, Okla., recently, Dr. Van H. Manning delivered an address on "An Oil Entente for All Nations." An open-door policy for all nations, as far as the oil industry is concerned, was advocated by the speaker. A nationalistic tendency has developed among certain nations, Dr. Manning declared, which results in discrimination against aliens in the search for petroleum. He favors a plan for all nations to work together in the production of oil and thus remove any possible menace of a petroleum shortage.

General Secretary Harry H. Smith submitted his annual report, which reviewed the activities of the association during the past twelve months, and on recommendation of the nominating committee the executive committee was increased from ten to fifty-nine.

Personal Notes

WALTER E. AYMOND, formerly manager of the Arkansas Light & Power Company, Arkadelphia, Ark., which he left three years ago to take charge of the Opelousas Light Plant, Opelousas, La., was killed as a result of an accident while working on the service lines.

Mr. Aymond was connecting a couple of wires carrying 110 volts, and in removing the slack from this wire gave it a jerk. As the wire became taunt it came in contact with another high-voltage wire carrying about 1,100 volts. The insulation on the high-voltage wire was worn through and Aymond received the whole charge through his body, killing him instantly.

G. G. HANKS, local manager of the Arkansas Natural Gas Company, Little Rock, Ark., has been transferred to the company's office at Hope. B. C. Logan, of Little Rock, will succeed Mr. Hanks.

J. GORDON BALDWIN, formerly with the Russell Manufacturing Company, has been elected secretary-treasurer of the Middletown (Conn.) Gas Light Company to succeed E. C. Watson, who has taken a position with the Burns Lace Company.

E. M. RICHARDS has resigned his office as treasurer of the Massachusetts Gas Companies and of the subsidiary companies in which he has held the same position. He will, however, retain his connection with a trustee of the Massachusetts Gas ests as trustee and director of various companies and has been elected a trustee of the Messachusetts Gas Companies. Mr. Richards will shortly be associated with the banking house of Hayden, Stone & Co.

PIERRE P. PLANTIGUA, of the Gas Machinery Company, accompanied by his daughter, sailed for Europe Oct. 23 for a three months' stay.